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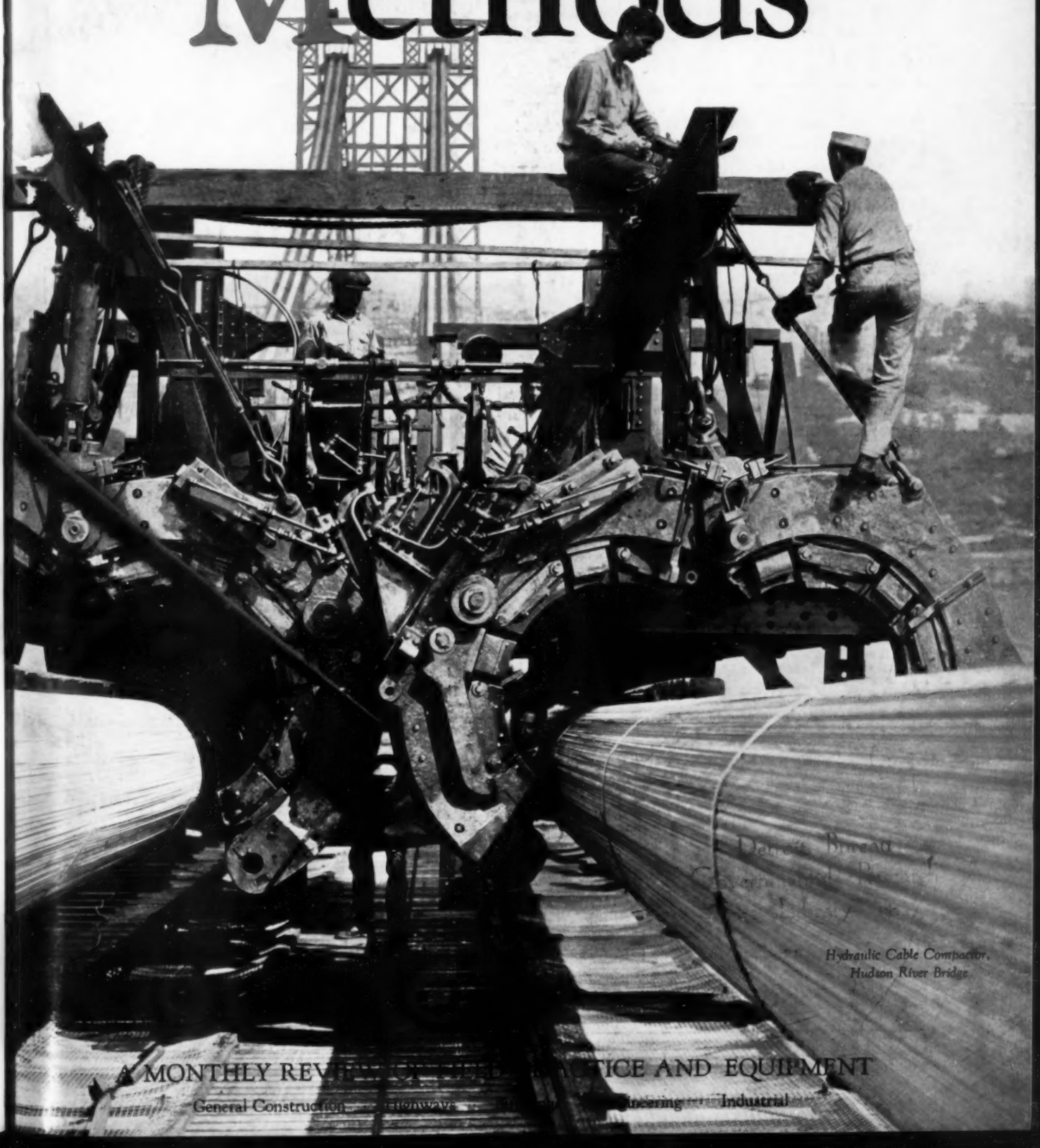
TECHNOLOGY DEPARTMENT

First Copy

April
1931

Construction Methods



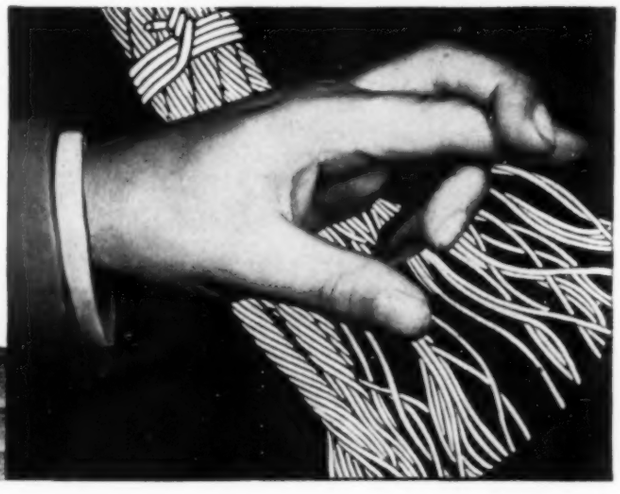
Hydraulic Cable Compactor,
Hudson River Bridge

A MONTHLY REVIEW OF [illegible] PRACTICE AND EQUIPMENT

General Construction · Highways · [illegible] · Engineering · Industrial

HOLD YOUR HANDS LIKE THIS ▲ ▲

NOW DO THIS ▲ ▲



THIS CONSTRUCTION IN WIRE ROPE REMOVES INTERNAL STRESS ▲ ▲

Preforming means that wires and strands are preformed or preshaped to the exact helical position they assume in the completed rope structure. Instead of a "straightening out" tendency, Tru-Lay strands lie naturally in position. This is best illustrated by holding your forefingers together as shown at the right.

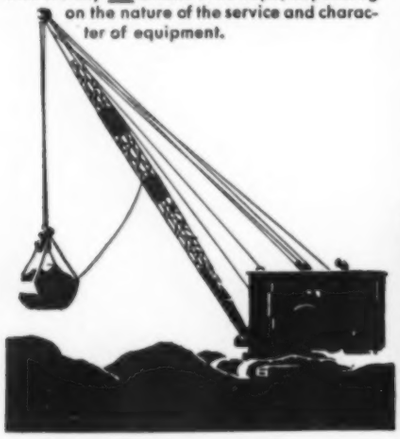
Now cross your fingers and note the pressure between them. When you uncross your fingers they fly apart—just as the strands do when you cut ordinary wire rope.

In Preformed Wire Rope strands are free to work without undue internal friction. The absence of internal stress eliminates premature failure due to fatigue. In Preformed Wire Rope each strand carries an equal share of the load . . . and wear. That is why Tru-Lay gives from 30% to 300% more service depending on the nature of the service and character of equipment.

170% INCREASED SERVICE . . . ON LOCOMOTIVE CRANE

A Sand Company in Oklahoma reports 6 months, 2 days service with Tru-Lay as against 2 months, 6 days service with ordinary wire rope . . . an additional service of 100 days.

This is one instance, chosen at random from hundreds of service reports which show an increased service of anywhere from 30% to 300% with Tru-Lay Preformed Wire Rope, depending on the nature of the service and character of equipment.



PREFORMED WIRE ROPE — AMERICAN CABLE COMPANY — Preformed Strong from Lasts Longer — NEW YORK — TRU-LAY

ACCO — A·C·

Let us give you more information. We will be glad to refer you to a nearby user of Tru-Lay Preformed Wire Rope. Address:

AMERICAN CABLE COMPANY
Incorporated
New York Central Building, 230 Park Avenue
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District Offices: **Chicago, Detroit, Philadelphia, Pittsburgh, Tulsa, San Francisco**

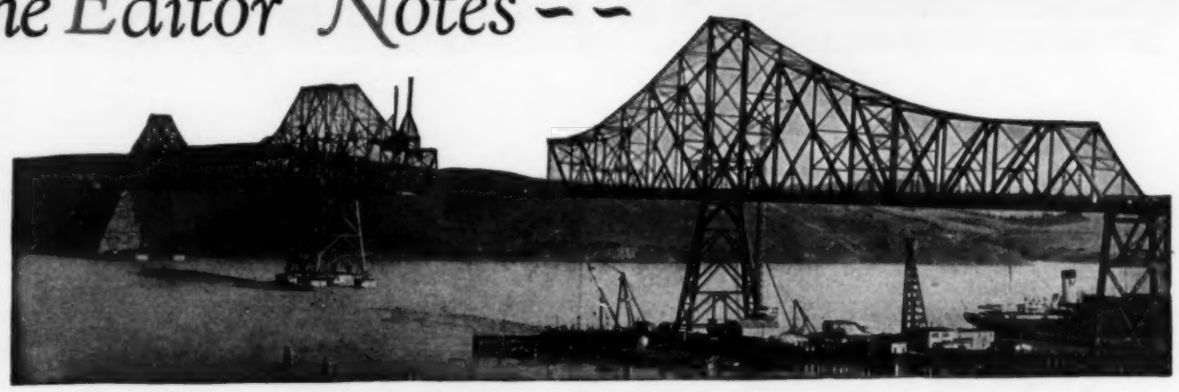
An Associate Company of the American Chain Company, *Incorporated*

PREFORMED WIRE ROPE
TRADE TRU-LAY MARK
(REG. U.S. PAT. OFF.)

CONSTRUCTION METHODS, April, 1931. Vol. 13, No. 4. Published monthly. McGraw-Hill Publishing Company, Inc., Tenth Avenue at Thirty-sixth Street, New York N. Y. $1 per year; 10 cents per copy. Entered as second-class matter. October, 1926 issue. Vol. 8, No. 19, at the Post Office at New York, N. Y., under the Act of March 3, 1879. Printed in U. S. A.

TECHNOLOGY DEPT.

The Editor Notes - -



Hoover Dam Contract Awarded

NO TIME was lost in awarding the contract for the Hoover dam. On March 11, one week after bids had been opened at Denver, the U. S. Bureau of Reclamation officially accepted the tender of the low bidder, a group of Western contractors organized under the name of Six Companies, Inc., of San Francisco, to build the 730-ft. high dam and power house of the Boulder Canyon project on the Colorado River. Based on the estimated quantities and unit prices the cost of this part of the project will be $48,890,995. Six Companies, Inc., is a consolidation of experienced contracting organizations, including the Utah Construction Co., Henry J. Kaiser and W. A. Bechtel Co., MacDonald & Kahn Co., Ltd., Morrison-Knudson Co., J. F. Shea Co. and Pacific Bridge Co.

Two other contractors, the Arundel Corporation of Baltimore and Woods Bros. Corporation, of Lincoln, Neb., submitted bids totaling, respectively, $53,893,879 and $58,653,107. In addition, three other irregular bids were received. The low bid, therefore, is about $5,000,000 less than the next highest bid.

Unit Prices

A study of the bids discloses that of the total of 119 contract items on which unit prices were submitted, nine involve the expenditure of more than a million dollars each. In money value the biggest single item (No. 4) is for 1,563,000 cu.yd. of excavation of all classes in diversion tunnels, bid in at $8.50 per cubic yard, making a total of $13,285,500 for this item alone — a huge contract all by itself. The unit prices of the other two bidders on this item were $8.50 and $8, respectively. The second largest item (No. 54) for 3,400,000 cu.yd. of concrete in the dam (the Government supplying the cement) brought a unit price of $2.70 per yard from the successful bidder, as against $4.15 and $3.40 from the other two. This item, at the $2.70 unit price, totals $9,180,000. Third in money value is Item No. 52 for 312,000 cu.yd. of concrete lining in diversion tunnels which, at $11 per yard, totals $3,432,000. The other unit prices on this item were $8 and $15.

The three big items above noted will account for a payment of $25,897,500 —more than half the value of the entire contract. As a matter of fact, this figure does not represent the real cost as it excludes any allowance for cement, which is to be furnished to the contractor by the Government.

Preliminary Work

The huge project presents a challenge to the constructor. The site is a canyon in the desert, difficult of access and remote from any large-sized town. Before large-scale construction operations can start, therefore, it will be necessary to build a municipality, Boulder City, Nevada, to accommodate the engineering and construction personnel. Other preliminaries include highway and railway construction to provide access to the damsite—covered by separate contracts previously let—and an inclined freight elevator down the steep side of the canyon wall.

With a temperature range in southern Nevada from 20 to 120 deg. F. and a mean temperature of 94 deg. F. in July climate is a factor with which the contractor must reckon. At the damsite in summer the sun beats down on a broken surface of lava rocks, so hot at midday that they can not be touched with the bare hand.

The sequence of construction operations will start with the 50-ft. diameter diversion tunnels to handle the flow of the Colorado River, and, when completed, to serve as spillway conduits and penstocks. This phase of the work is to be finished within two years. Then will come the cofferdams and finally the dam itself, for which six and one-half years are allowed for completion.

CONSTRUCTION METHODS

A monthly review of modern construction practice and equipment

ROBERT K. TOMLIN, *Editor*

Editorial Staff

VINCENT B. SMITH NELLE FITZGERALD

J. I. BALLARD (San Francisco)

WILLARD CHEVALIER, *Publishing Director*

A McGraw-Hill Publication

Tenth Avenue at 36th Street, New York

Getting More Out of the Paver

DISCUSSING the question of pavers operated in tandem, a highway engineer whose broad acquaintance with conditions throughout the country gives him full authority to speak, expresses the opinion that the tandem arrangement is useful at present only in what might be called emergency cases. Attention, he believes, ought first to be focussed on getting the utmost out of a single paver.

Specifications of highway departments in different states provide for mixing periods ranging from 1¼ min. to 50 sec. Investigations by the Division of Management of the U. S. Bureau of Public Roads prove conclusively that there is no advantage to be gained, either in flexural or compressive strength, or in uniformity of mixture, by mixing longer than 60 sec. Thorough investigation into the subject of batch sizes shows that the modern 27-E paver (rated capacity, 27 cu.ft.) is capable of mixing up to 35 cu.ft. on a 6-per cent grade without detriment to the quality of the concrete.

The findings of the Bureau of Public Roads indicate that the mixing periods required by many states are wasteful. California, with a mixing time of 50 sec., used two pavers in parallel and obtained a sustained production (Sept. 29 to Oct. 19, 1930, inclusive; one day of rain and Sundays excluded) of 111.5 batches an hour. By specifying a reasonable mixing period and a larger batch, engineers can do much to reduce the cost of concrete pavement.

No News, No Progress

NOT so long ago, Louis Wiley, Business Manager of the *New York Times* said this:

> "Advertising is news. The manufacturer of the product makes the news, the advertising agent collects, writes and edits the news. The publisher prints it. The reader reads and believes (or disbelieves) and is influenced by it . . .
>
> "If a company has no news to tell, it is not going forward, but backward. Advertising develops news, encourages a manufacturer to make improvements which make news. The stimulation that the news idea in advertising gives to our industrial progress is an important influence . . .
>
> "Advertising is destined to play an even greater part in our lives in the future. Because it is so important, we must all do our part to make it better, more effective, more believable."

Well said, Mr. Wiley!

And these basic truths apply to industrial advertising much more pointedly than to general consumer advertising, which Mr. Wiley had particularly in mind.

The advertising pages of *Construction Methods* are news pages—news of immediate and vital importance to our readers. A substantial share of the progress achieved by construction methods and practice is directly due to the manufacturer of materials and equipment; and the news of his work, reiterated consistently through the advertising pages, is a powerful influence in behalf of that progress.

The manufacturers represented in our advertising pages are there because they have "news" to tell; and, as Mr. Wiley points out, they are enrolling themselves with the forward-moving concerns that serve the construction industries.

Willard Chevalier
Publishing Director

McGRAW-HILL PUBLISHING COMPANY, INC., TENTH AVENUE AT 36TH STREET, NEW YORK, N. Y.

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LONDON, *Aldwych House, Aldwych, London, W.C. 2*

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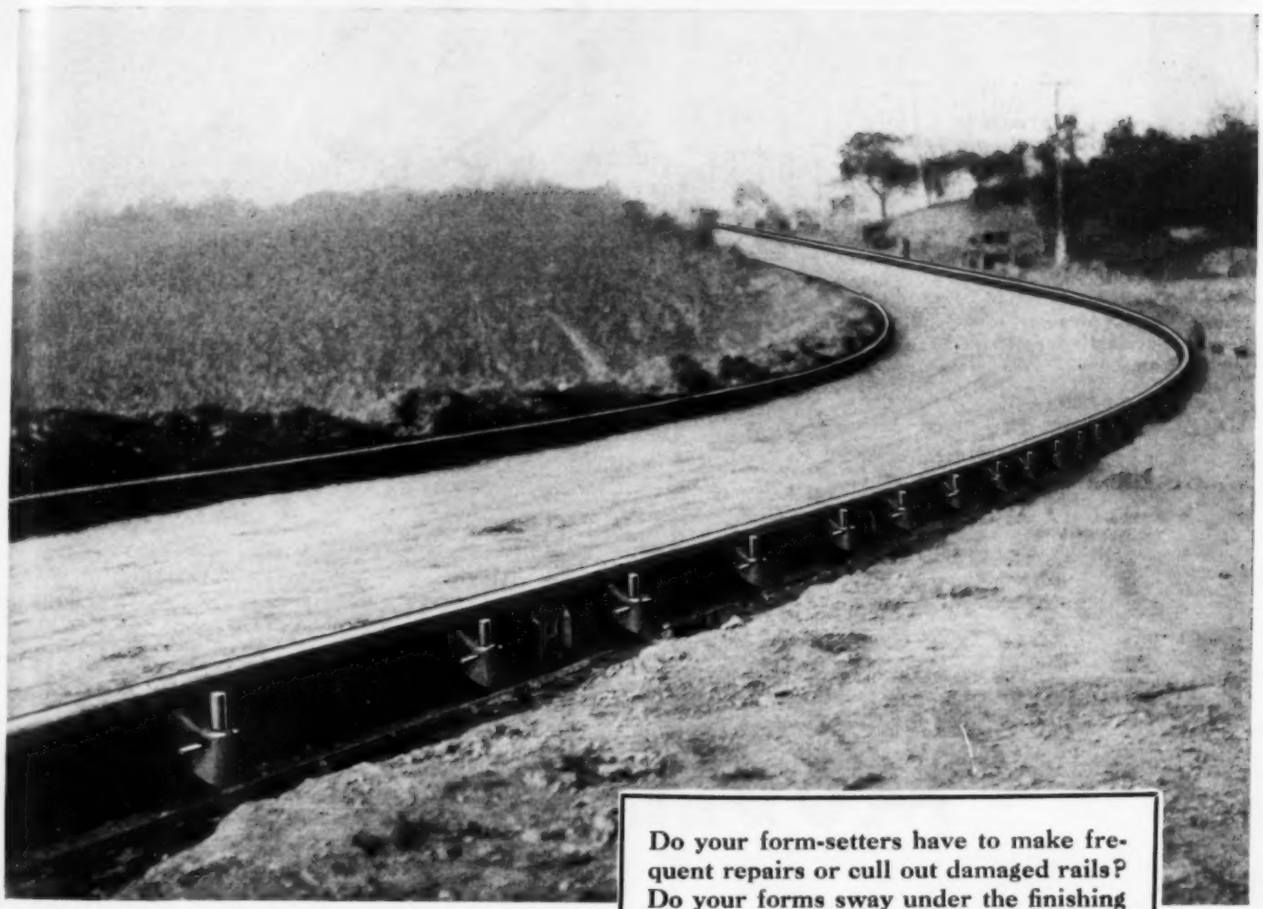

Are your road form costs too high?

Do your form-setters have to make frequent repairs or cull out damaged rails? Do your forms sway under the finishing machine?—Or settle under a heavy subgrader? Are you compelled to grind high spots in the road surface?

These are all signs of road form inefficiency. Road Forms built four or five years ago are not adequate to meet modern demands or withstand the vibration of modern machinery. If you are using old, obsolete forms, replace them today with the standard Road Form—Heltzel Superior Lock Type. Heltzel Forms have more than seventeen points of distinct superiority. Rails less than 8-in. high have a 6-in. base, and rails 8-in. or more in height have an 8-in. base.

Write for full information to THE HELTZEL STEEL FORM & IRON CO., WARREN, OHIO.

HELTZEL

Autocar construction models are thoroughly at home under the jaws of a steam shovel. Heavy loads, soft ground, and hard going are exemplified in this picture of an Autocar owned by John Longo, Corona, L. I. It is shown at work in the preparation of North Beach Airport, L. I., the most centrally located airport in New York.

PRIDE OF THE CONSTRUCTION FLEET . . .
MODEL C AUTOCAR!

Model C Autocar is distinctly a construction man's truck. It is made in 172-inch wheelbase length, primed for the tearing, grinding, overloading, quick starting and stopping, 24-hour service that it gets on construction work,—hauling gravel or bricks, dirt or debris over every known type of terrain. It is also made in 186-inch wheelbase length with special power take-off for ready-to-pour concrete delivery work.

Model C and its heavy-duty mates for construction and building supply service have the Autocar 101-horsepower "Blue Streak" 6-cylinder engine; 12 gear ratios providing speed and pulling power; Autocar Double Reduction rear axle . . . Write for details regarding what construction men are doing with that husky, heavy-duty Autocar Model C.

AUTOCAR TRUCKS

PRECISION BUILT

THE AUTOCAR COMPANY, *Ardmore, Pa.*

Rock? ROCK!

The 25% more digging force at the dipper lip of a Northwest shovel makes possible the handling of 25% harder material! That's why they choose Northwests for hard digging!

Northwest Engineering Company

The world's largest exclusive builders of gasoline, oil burning and electric [illegible] shovels, cranes and draglines

[illegible] Bldg., 28 E. Jackson Blvd. [illegible]go, Ill., U. S. A.

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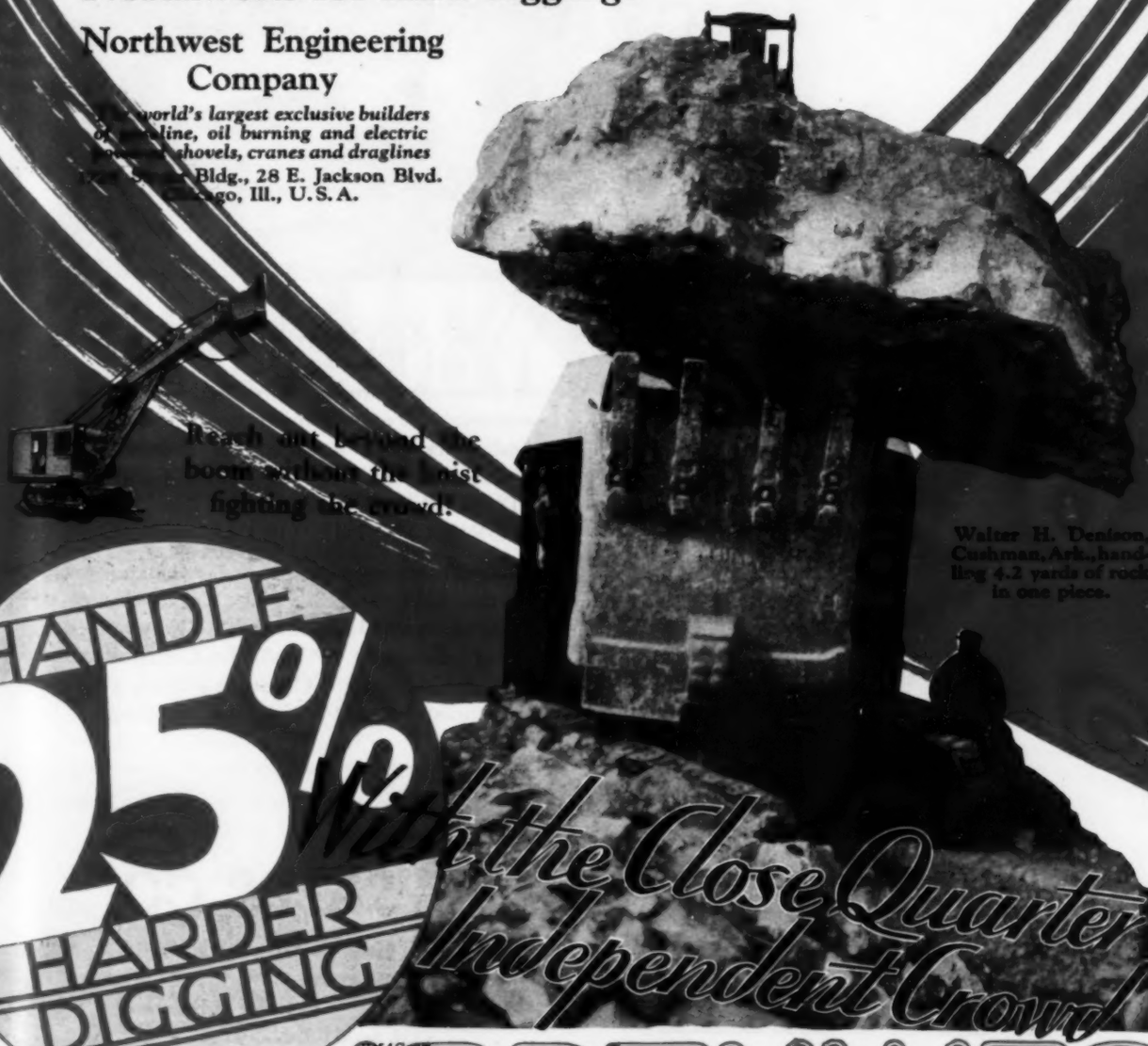

Reach out beyond the boom and on the hoist fighting the crowd.

Walter H. Denison, Cushman, Ark., handling 4.2 yards of rock in one piece.

HANDLE 25% HARDER DIGGING

With the Close Quarter Independent Crowd

NORTHWEST

CLYDE HOISTS - DERRICKS

You can't beat a "CLYDE"

A common expression voiced by a vast number of experienced hoist operators and warranted by the fact that Clyde Hoists are BUILT OF THE FINEST MATERIALS and with the BEST WORKMANSHIP OBTAINABLE.

The illustrations show the construction of the field house of the University of Wisconsin at Madison, Wis. The work is being done by Wm. M. Christensen Const. Co., using a Clyde two-drum gasoline hoist located inside the building.

CLYDE IRON WORKS SALES CO.

CLYDE

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SUCCESSFUL PERFORMANCE A.G.C.

122 pages of useful information

These are the Chapter Headings in the "Driller's Handbook"; covering completely and interestingly these many subjects in which you are interested.

Introductory and Historical—Lubrication,—Operating—Shank and Bits,—Hose, Couplings and Valves,—Modern Rock Drill Types,—Explosives and Blasting,—Tables and Data.

HERE'S YOUR "DRILLER'S HANDBOOK"

This useful book—122 pages full of valuable information on drills, explosives, blasting, etc.,—is offered you with the compliments of the Cleveland Rock Drill Co.

Its price is regularly $1.00 but you can get the "Driller's Handbook" absolutely free by filling in completely and mailing the coupon shown below.

This offer is open only to those who are now using or expect to use Rock Drills in the near future.

As the edition is limited we urge that you send in the coupon at once.

THE CLEVELAND ROCK DRILL CO.
3734 East 78th St., Cleveland, Ohio

Clip and Mail the Coupon

CLEVELAND ROCK DRILLS

Do you know?

—how to properly start a new drill?
—how much you gain by properly lubricating a Rock Drill?
—how worn chucks cause piston breakage?
—how lack of oil causes parts to break?
—how to prevent freezing in cold weather?
—how much money air leaks cost per shift?
—how drill shanks should be quenched?
—how to open up plugged drill steel?

These questions and many others are fully and clearly answered in the "DRILLER'S HANDBOOK."

THE CLEVELAND ROCK DRILL CO.
3734 East 78th St., Cleveland, Ohio

Gentlemen: Please send me the "Driller's Handbook."

Name .....

Company .....

Address .....

We are now using the following types of machines

Hand Hammer Drills.....
Paving Breakers .....
Clay Diggers .....
Back Fill Tampers.....

Ransome-CENTRAL MIXING PLANTS

Three Yard Ransome owned by George M. Brewster & Son, Bogota, N. J. Photo taken 1930.

28-S Ransome in the Central Mixing Plant of McCall Construction Co., in Northern Illinois. Photo taken 1921.

THERE are good reasons why the following prominent representative manufacturers of concrete use Ransomes—

P. Flanigan & Son, Baltimore, Md., 1 yd. mixer

L. G. Everist, Inc., Sioux City, Iowa 2 yd. mixer

Chas. H. Fry Construction Co., Erie, Pa., 1 yd. mixer

Ready Mixed Concrete Co., Pittsburgh, Pa., two 3 yd. mixers

General Material Co., St. Louis, Mo., five 2 yd. mixers

Hankins-Paulson Co., Uniontown, Pa., 1 yd. mixer

Ready Mixed Concrete Co., Kansas City, Mo., three 2 yd. mixers

McClain Sand Co., Morgantown, W. Va., 1 yd. mixer

Builders Supply Co., Bellingham, Wash., 1 yd. mixer

Warner Co., Philadelphia, Pa., two 1½ yd. mixers, three 2 yd. mixers and two 3 yd. mixers

Ready Mixed Concrete Corp., New York, N. Y., 3 yd. mixer and 1½ yd. mixer

Ready Mixed Concrete Corp., Richmond, Va., two-2 yd. mixers

Super Concrete Corp., Washington, D. C., two 3 yd. mixers

Jahncke Service, Inc., New Orleans, La., 1 yd. mixer

Caldwell Construction Co., Charlotte, N. C., 1 yd. mixer

Corson & Gruman, Washington, D. C., 1 yd. mixer

John P. Callaghan, Inc., Newark, N. J., two 1½ yd. mixers

Fort Worth Sand & Gravel Co., Ft. Worth, Texas, two 1 yd. mixers

Big Rock Stone & Material Co., Little Rock, Ark., 2 yd. mixer

Avril Tru-Batch Concrete, Inc., Cincinnati, Ohio, 2 yd. mixer and 3 yd. mixer

Scranton Ready Mixed Concrete Co., Scranton, Pa., 1 yd. mixer

Guaranteed Concrete Co., St. Paul, Minn., two 3 yd. mixers

L. E. Whitham & Co., Austin, Texas, 1½ yd. mixer

Ready Mixed Concrete Co., West Reading, Pa., 1 yd. mixer

Geo. M. Brewster & Son, Bogota, N. J., two 3 yd. mixers

Carleton Company, Office, New York City; Plant, Brooklyn, N. Y., 3 yd. mixer

Corson Construction Corp., New York, N. Y., two 1½ yd. mixers

Birmingham Slag Co., Birmingham, Ala., 1 yd. mixer

N. Ryan Company, Inc., Brooklyn, N. Y., two 3 yd. mixers

Samuel Braen's Sons, Hawthorne, N. J., 3 yd. mixer

York Ready Mixed Concrete Co., York, Pa., 2 yd. mixer

Liberty Corp., Philadelphia, Pa., 3 yd. mixer

Union Paving Co., Philadelphia, Pa., 3 yd. mixer

Camden Lime Co., Camden, N. J., 3 yd. mixer

Boston Sand & Gravel Co., Boston, Mass., 2 yd. mixer

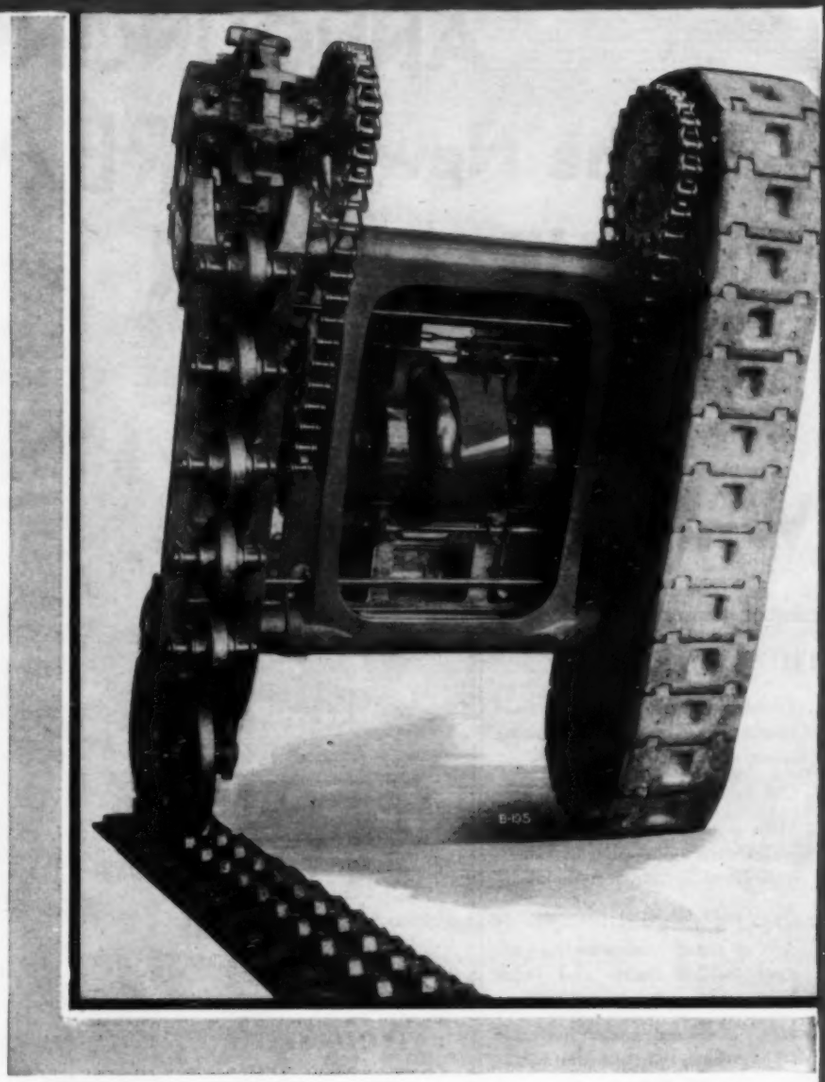
T. L. Herbert & Sons, Nashville, Tenn., one 3 yd. mixer

Write for Big Mixer Bulletin No. 122

Ransome Concrete Machinery Company

1850—Service for 81 Years—1931

Dunellen New Jersey



ONLY simple rugged construction throughout can make a satisfactory shovel. Look at the bottom view of this mounting. Its simplicity and strength are typical of Bucyrus-Erie construction.

A-253

BUCYRUS ERIE

BUCYRUS-ERIE COMPANY
South Milwaukee, Wisconsin

Representatives throughout the U. S. A. *Branch Offices:* Boston, New York, Philadelphia, Atlanta, Birmingham, Pittsburgh, Buffalo, Detroit, Chicago, St. Louis, Kansas City, Mo., Dallas, San Francisco. Offices or distributors in all principal countries.

1/2-yard
5/8
3/4
7/8
1
1-1/4
1-1/2
1-3/4
2
2-1/4
2-1/2
3
3-1/2
4
4-1/2
5 and up to 16 yards

Shovels
Draglines
Clamshells
Lifting Cranes
Dragshovels
Magnet Cranes
Tunnel Shovels
Dredges
Dragline Buckets

Gasoline
Diesel
Gas + Air
Electric
Steam
Diesel-Electric

ANNOUNCING

The New FAIRBANKS SKIP MIXER SCALE

and the Fairbanks Wheelbarrow Scale

Fairbanks Skip Mixer Scale showing the three ingredient beams.

THESE SCALES:—

1. Enable contractors to meet rigid specifications without increasing labor costs.
2. Cut mixing time on every job.
3. Meet standard specifications for scales such as adopted by American Road Builders Association.
4. Are easily transported.
5. Are of sturdy construction—all-steel welded frame and beam box.
6. Have over and under indicator which shows when beam is approaching balance.
7. Automatic safety gear relieves weighing mechanism of shock on dropping of skip.

New scales provide accurate control of mix and reduce mixing time

Fairbanks have designed two new scales to meet the need of contractors who find it desirable or necessary to mix concrete aggregates by weight. These scales—typically "Fairbanks" in accuracy and dependability—enable the contractor to meet rigid specifications without increasing the labor cost of mixing.

The Fairbanks Wheelbarrow Scale — sturdy, accurate, light weight for easy transportation.

Every contractor, engineer and architect will be interested in complete information about these new Fairbanks scales. If your equipment dealer is not prepared to furnish this information, we will send it promptly upon request.

Fairbanks Skip Mixer Scale mounted on special dolly for towing.

FAIRBANKS, MORSE & CO.
900 S. Wabash Ave., Chicago
And 40 principal cities—a service station at each house.

Fairbanks Scales

Preferred the *World Over*

"PAYING PRACTICAL DIVIDENDS IN STEADY ALL-AROUND SERVICE"

. . . . *that's* WHY EVERY OWEN BUCKET PROVES A MONEY-MAKING INVESTMENT

Owen Buckets are rugged, day-after-day dependables. No matter what the conditions—no matter how difficult the material—or how big the job, Owen Buckets make good any and every time they are put to work. That means—in user's language—they pay a profit in actual work accomplished.

It's because Owen Buckets are constructed with the many demands of clamshell bucket jobs well in mind. Not for a too limited service—not over-specialized. It's the general all-around efficiency that assures the money-making value in every Owen—that never-failing ability to "do a bigger day's work than any other bucket of the same weight and capacity."

Write us for facts on how and where Owens are turning time into dollars saved. We'll also send literature that will show you some worthwhile bucket construction features.

The Owen Bucket Co., 6023 Breakwater Ave., Cleveland, Ohio

OWEN CLAMSHELL BUCKETS

Owen Buckets

Cranemobile handier than truck crane here . . . and saved 2 men!

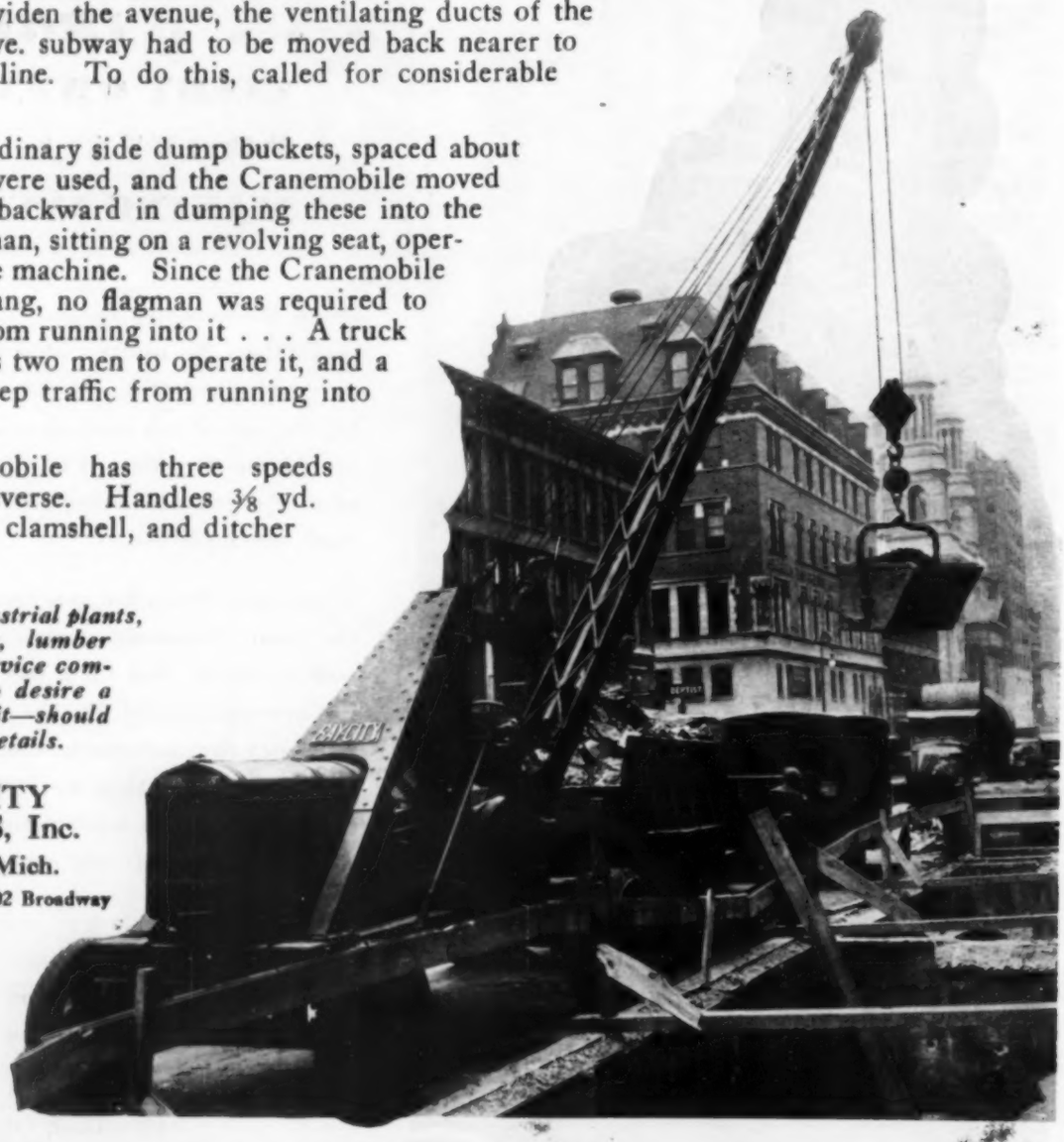
In widening Lexington Ave. between 72nd and 86th Streets, New York City, Poirier & McLane, general contractors, used this Bay City Cranemobile in preference to a truck crane. In order to widen the avenue, the ventilating ducts of the Lexington Ave. subway had to be moved back nearer to the building line. To do this, called for considerable excavation.

A series of ordinary side dump buckets, spaced about 10 ft. apart, were used, and the Cranemobile moved forward and backward in dumping these into the truck. One man, sitting on a revolving seat, operated the entire machine. Since the Cranemobile has no overhang, no flagman was required to keep traffic from running into it . . . A truck crane requires two men to operate it, and a flagman to keep traffic from running into the overhang.

The Cranemobile has three speeds ahead and reverse. Handles ⅜ yd. shovel, ⅜ yd. clamshell, and ditcher attachment.

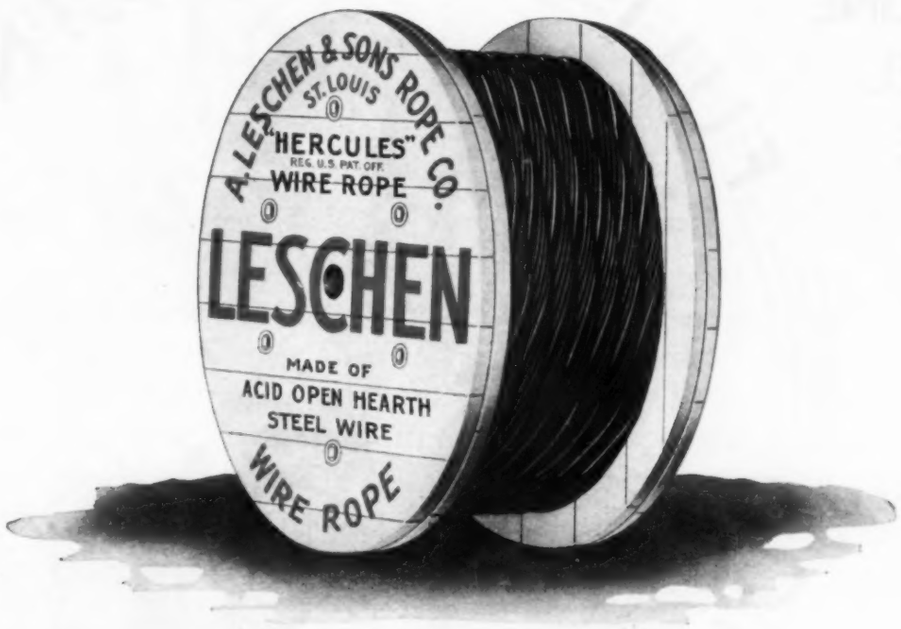
Truckmen, industrial plants, material yards, lumber yards, crane service companies—all who desire a fast mobile unit—should write for full details.

BAY CITY SHOVELS, Inc.
Bay City, Mich.
New York Office, 302 Broadway



BAY-CITY SHOVELS

THE BAY-CITY FAMILY OF FAST WORKERS



"Hercules" (Red-Strand) Wire Rope Has Stood the Service Test

Results are what count, and the actual performance record of "HERCULES" (Red-Strand) Wire Rope has proved that it is dependable and economical. Its long life is due to the fact that it is made of material that is correctly balanced in strength, toughness and wearing qualities. Furnished in both the Patent Flattened Strand and Round Strand constructions in order to meet all conditions encountered on the numerous types of wire rope using equipment. Our No. 37 Catalog giving further particulars, will be mailed gladly to anyone interested in better wire rope service.

Made Only by **A. LESCHEN & SONS ROPE CO.** Established 1857

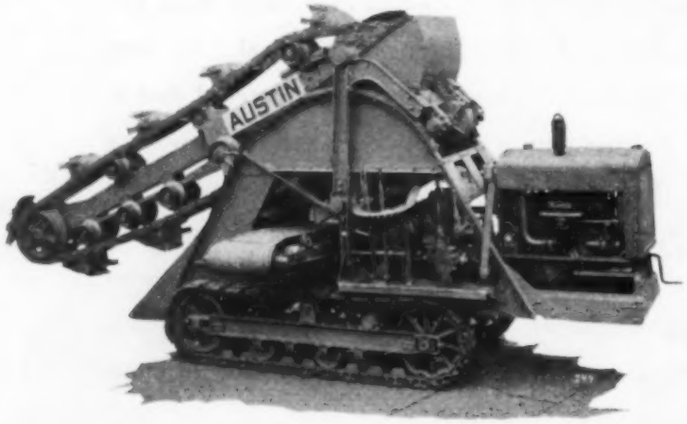
5909 Kennerly Avenue

ST. LOUIS

New York **Chicago** **Denver** **San Francisco**

TRENCH HOE
DRAGLINE
SHOVEL
CRANE

FULL REVOLVING
FULLY CONVERTIBLE



PUBLIC SERVICE DITCHER

DITCHER

THE NEW
MODEL 90

AUSTIN

always a step ahead

AUSTIN engineers believe these machines to be the finest produced in their thirty years of experience. The present day contractor knows machinery—he has to be shown—the new Austins illustrated on the opposite page were designed and built for the critical contractor—the man who is looking for a better value, still faster, still more dependable. Always a step ahead Austin invites your closest inspection and consideration of these advanced designs.

AUSTIN MODEL 55
CONVERTIBLE SHOVEL

No similar machine of the same adaptability and utility has approached this machine in simplicity of design.

Unit construction throughout, fewer working parts, two-speed transmission for all operations. Oversize parts, skilled workmanship, easy accessibility for all adjustments and replacement parts all result in greater efficiency, lower maintenance and a machine built to endure.

Capacity 11 cubic feet struck measure. Lifting capacity 12,000 lbs. Let us send you complete specifications and fully illustrated Bulletin.

AUSTIN MODEL 90
PUBLIC SERVICE DITCHER

Embodying those same "inbuilt" principles of design, quality and performance that have made Austin products universally famous.

Model 90 has a bucket capacity of 12 to 30 inches, digging depths 3 to 8 feet; overall width outside to outside 5 feet. Two-speed bucket line and sixteen speeds for digging. Positive boom crowd by use of self-locking worm gear; 20 inch standard conveyor.

Model 90 with its many mechanical refinements is a machine that will perform profitably for years to come in the toughest service. Let us send you descriptive literature.

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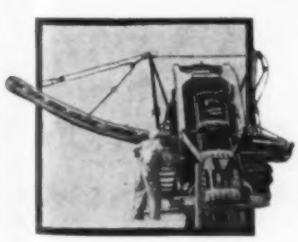

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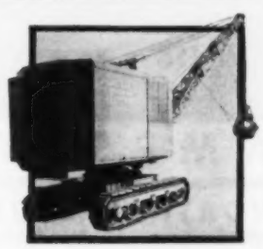
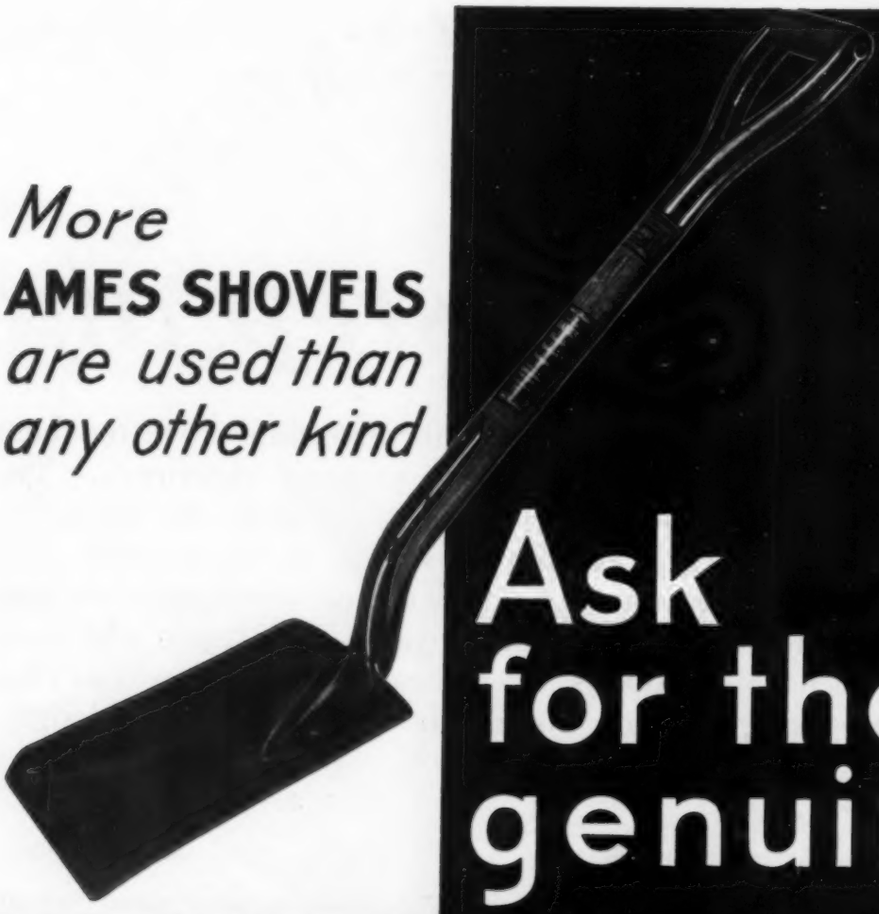


More
AMES SHOVELS
are used than any other kind



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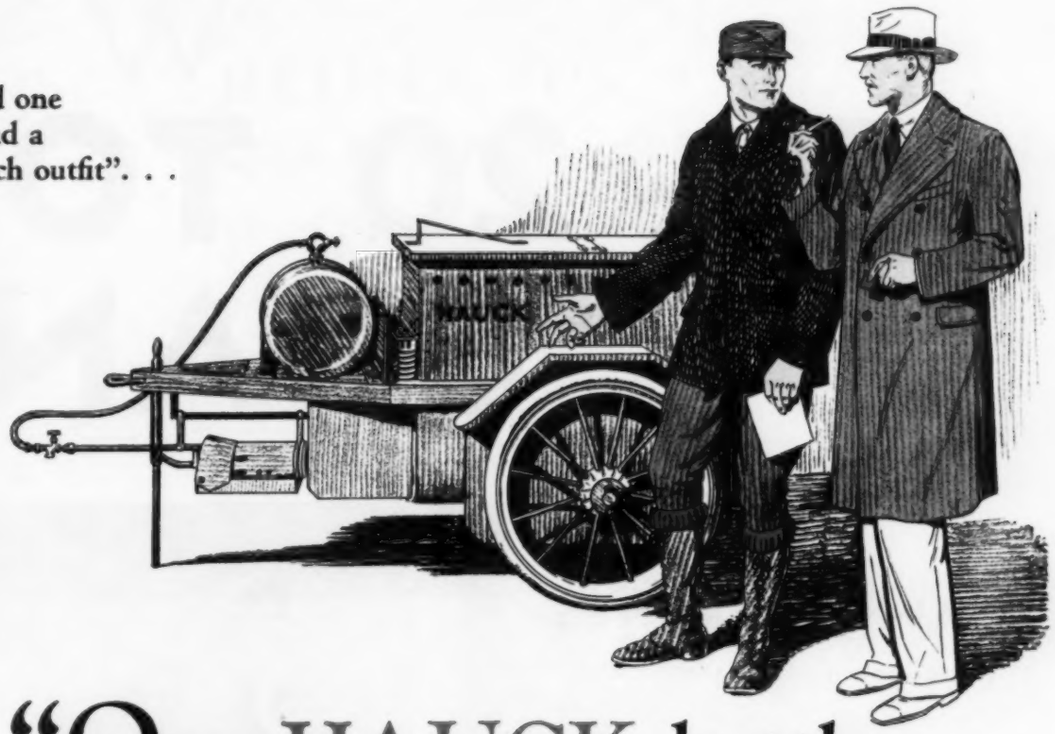
You can depend on the genuine O. Ames to help you meet the stiffest schedule. You'll find an Ames distributor always handy to you and your jobs—always the kind you like to do business with.

AMES SHOVEL & TOOL COMPANY

NORTH EASTON, MASSACHUSETTS • • • ANDERSON, INDIANA

"We loosened one strap and had a portable torch outfit". . .



"Our HAUCK kettle saved its cost on this job!"

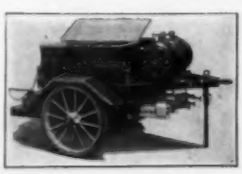
Roller bearings on all Hauck wheeled kettles. Built for fast long-distance trailing. Furnished also with legs only. Capacities 25 to 165 gallons; cost as little as $95 complete.

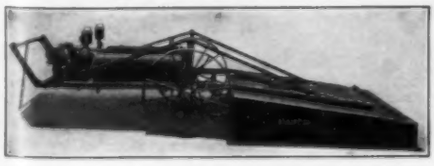
Other Hauck money-savers for construction and maintenance work are listed below. Shrewd road builders all over the country are using them. Every piece of Hauck equipment is built to *last* and backed by 31 years of practical experience in construction and industrial oil heating work. Send for detailed information and prices.

- Lead and Compound Melting Furnaces
- Combination Asphalt Cement and Tool Heaters
- Asphalt Surface Heaters—Kerosene and Fuel Oil
- Portable Torch Equipment for all purposes
- Circular and Straight Flame Burner Equipment
- Flame Thawing Equipment
- Concrete Mixer Heaters
- Water Heaters for concrete works.
- Salamanders—oil burning
- Brush Burning Torches
- Weed Burners

HAUCK TOOL HEATER
Heats tampers and smoothers; heats binder cement; three burners; fast and economical.

HAUCK SURFACE HEATER
for patching—saves time, labor, material, fuel.





YOU get *action* and *economy* out of a Hauck oil-burning kettle. Saves time—saves fuel—saves labor . . . and cuts out smoke complaints. The powerful Hauck heating burner works twice as fast as coal or wood—costs *less*—runs for hours without attention. The clean Hauck oil flame eliminates all smoke, all flying sparks, all ashes . . . operates on coal oil, kerosene or any light furnace oil.

The "Slide-Rail" Heat Control gives instant and positive adjustment of heat without turning a valve. Push burner toward kettle for more heat . . . pull away for less heat. Prevents overheating or "cooking" of asphalt. Burner and tank are removable—just loosen one strap and you have a portable torch outfit which is useful everywhere, both for maintenance and for new work.

It will pay you to buy a Hauck Kettle for each mixer outfit.

Write for complete new catalog giving performance figures, details and prices on the full Hauck line of money-saving heating equipment. Your copy is ready—write *today!*

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101-111 Eleventh Street, Brooklyn, N. Y.
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Oil Burning Construction Equipment

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5 to 20 TON CRANES

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CRAWLER CRANES

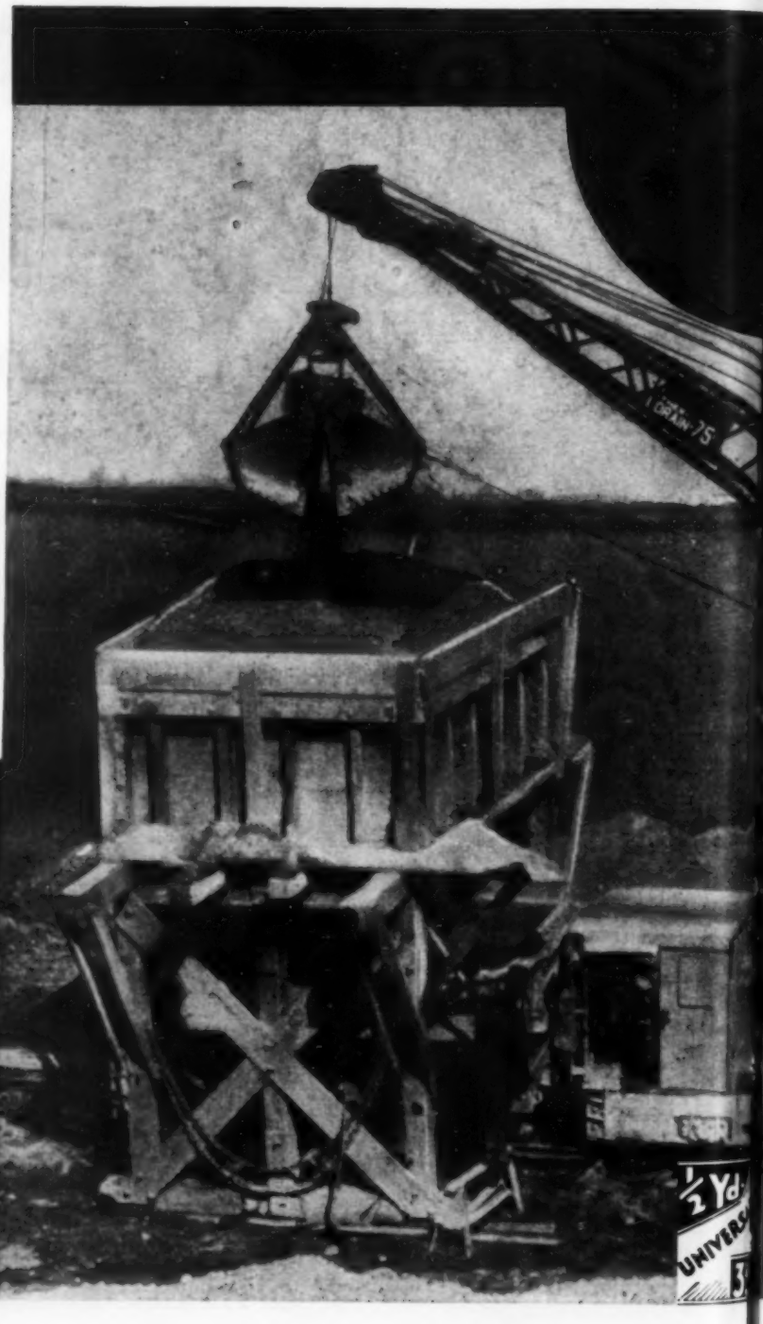
. . . . mounted on 2-speed Center Drive Crawlers. 7—15 tons. ½—1½ yard clamshell or dragline buckets.

LOCOMOTIVE CRANES

15—20 tons—Gas, Diesel, or Electric Powered.

TRUCK CRANES

Universal Truck Mounted Cranes, 5—6—7½ tons.



The
THEW SHOVEL
Company
LORAIN, OHIO

Shovels, Cranes, Clamshells, Draglines, Backdiggers, Skimmer-scoops built to the Center Drive design.

WHETHER IT'S A CRANE, CLAMSHELL OR DRAGLINE

. . . *trifles make perfection*

WATCH A LORAIN CRANE in action. Notice the smooth, precise control, the speed with which the operator slips from loading to hoist and swing, to unloading and back again.

This is because the designers of Lorain cranes have given unlimited attention to the hundreds of little details that contribute to fast, continuous operation. Simplification of controls, booster bands to engage the clutches, these and the other tremendous trifles listed here are a few of the many features that make Lorain Cranes move dirt and handle materials at minimum cost.

Tremendous Trifles

Boom Hoist
Double safety... self-locking worm drive plus secondary safety brake.

Simplified Controls
Just 2 levers, 2 foot pedals. Automobile type pedals as comfortable as an old pair of shoes.

Precision 2-Speed Hoist Line Control
Available for hook block work. Lowers or hoists the load at standard speed or moves it a fraction of an inch at a time for precision placing.

New Two-Sheave Fairlead
Saves Cables. Guiding sheave insures correct drum winding. Constant, direct lead to bucket.

Swing Brake
Quicker, more accurate swing control. An aid to operating on a grade. Prevents possibility of side sway in traveling.

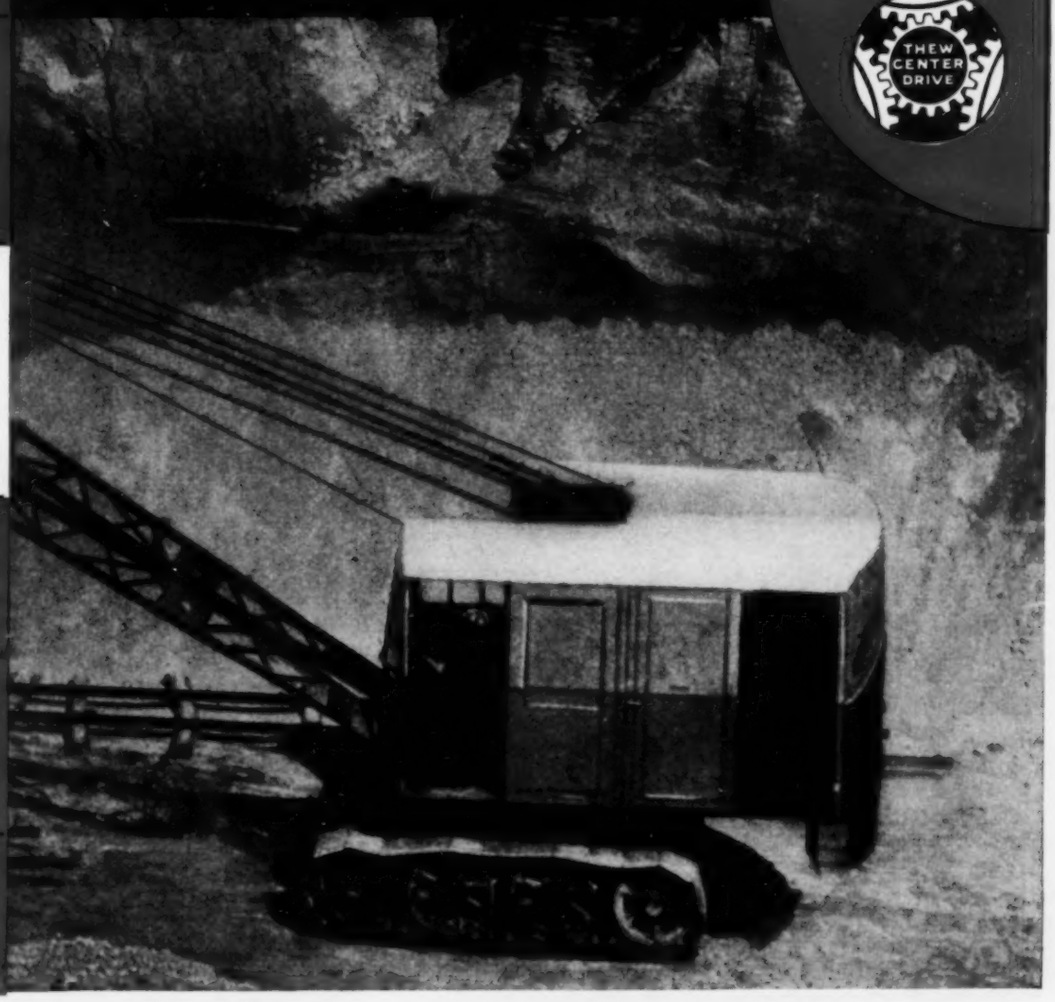
Booms
Two-section all steel in variable lengths. Goose-neck or straight top sections.

Simultaneous Operation
Hoists, swings and travels (or derricks the boom) all at one time.

Extended Tracks
One standard truck, variable in length to suit ground conditions.

THEW LORAIN
45 - 55 - 75

THEW CENTER DRIVE



TO HANDLE SAND AND GRAVEL

"NO BUCKET LIKE THE DREADNAUGHT"

So says this operator on the banks of the Monongahela. "We unload a 500 ton barge in 1½ hours—load thirty to forty 70 ton cars per day, which is a 35% increase in performance over various buckets formerly used at this dock. Cable wear is about 30% less." That's the story of all types of Blaw-Knox Dreadnaughts everywhere—less wear—less maintenance—increased performance. New catalog No. 1234 just off the press describes all types of Blaw-Knox Ball Bearing Buckets in detail—send for your free copy now.

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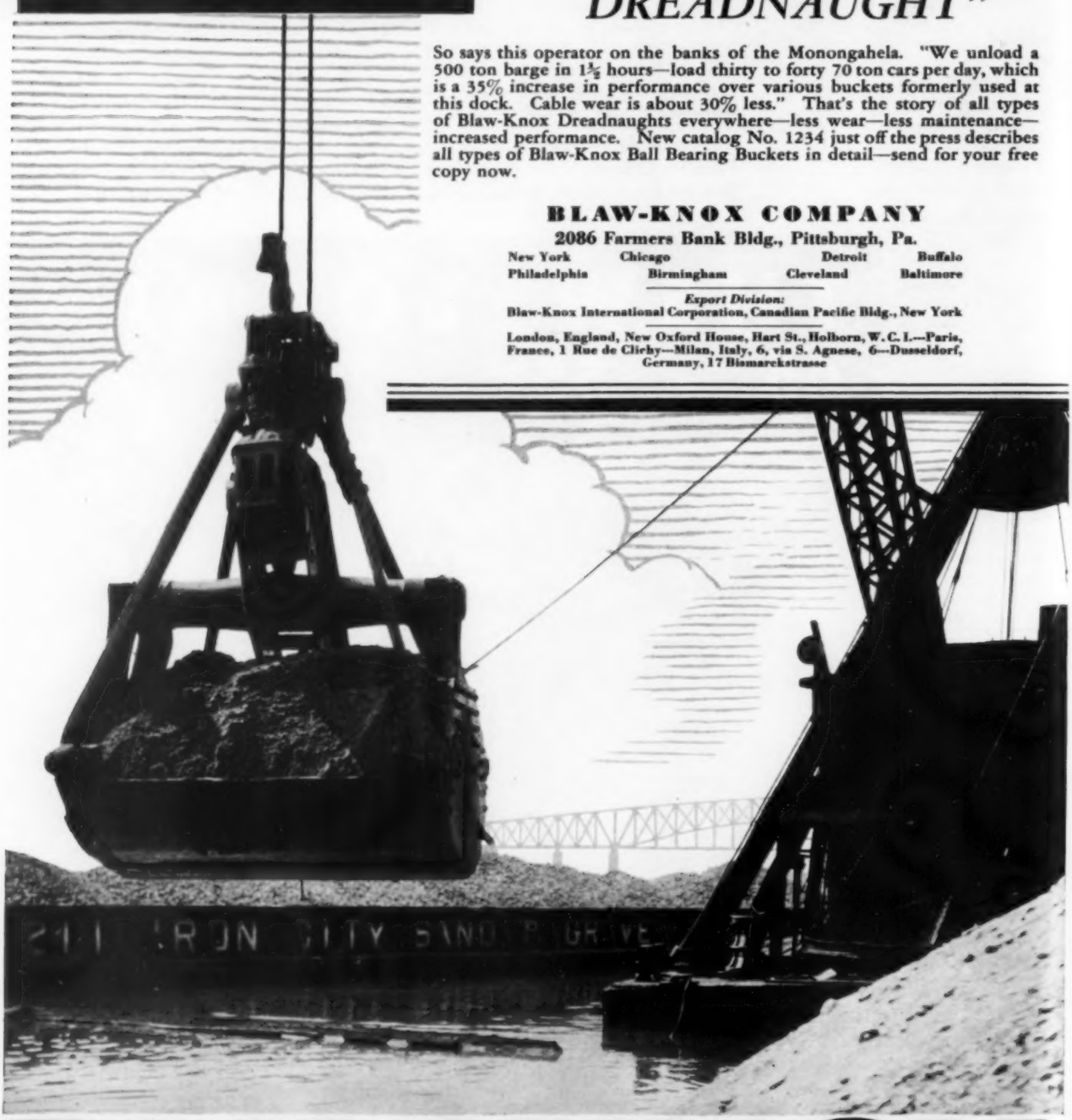
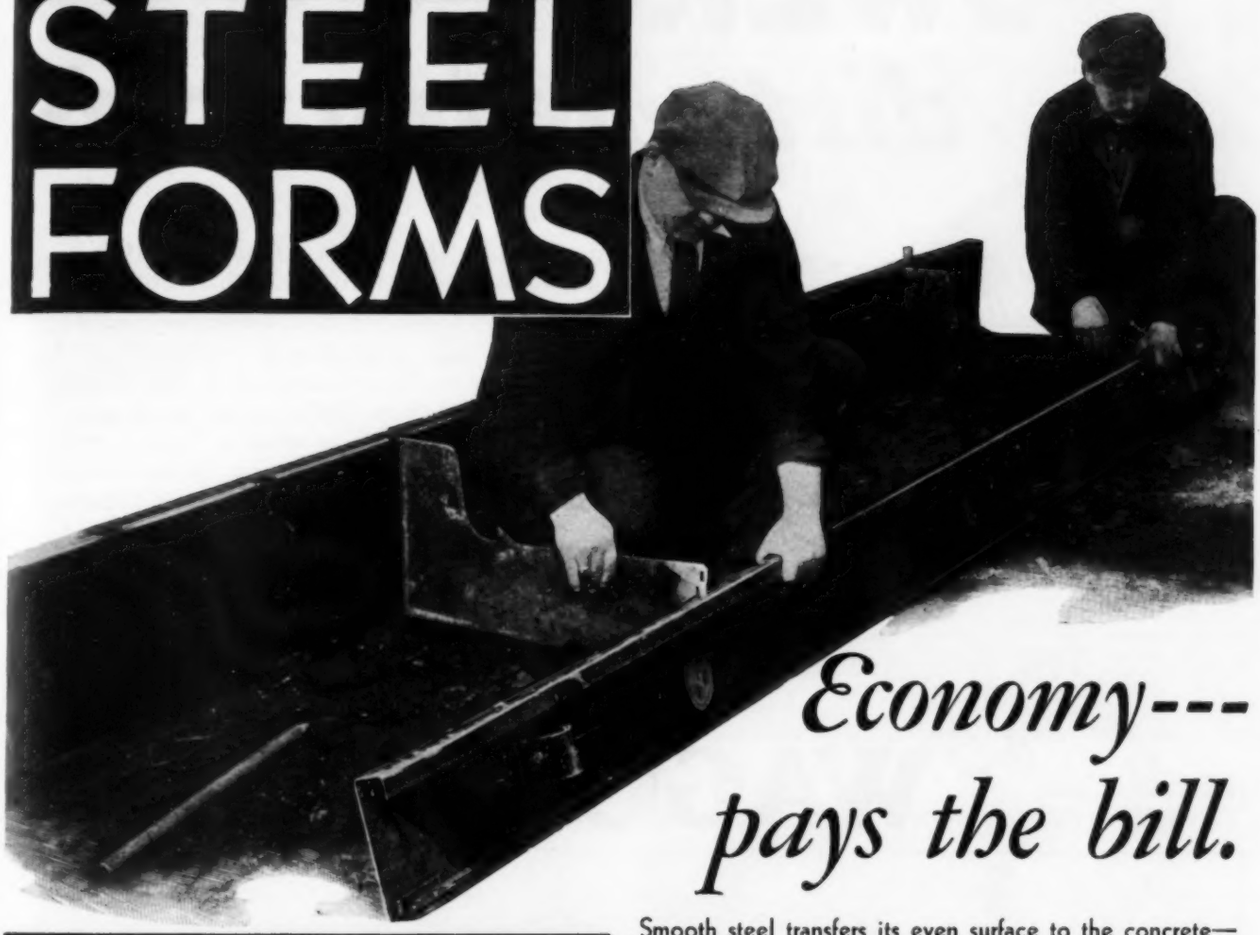
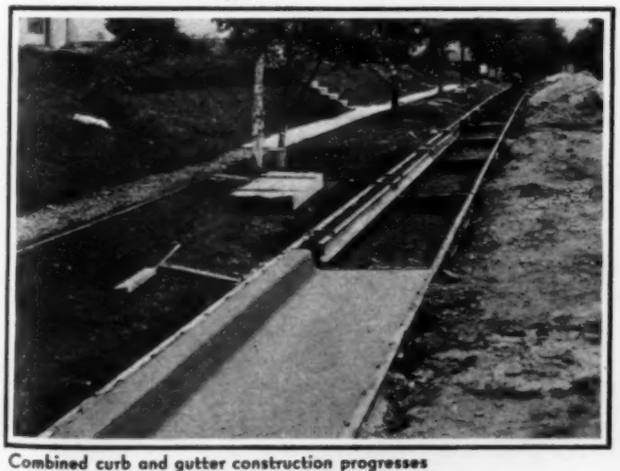


BLAW-KNOX

Blaw-Knox STEEL FORMS



Economy--- pays the bill.



Combined curb and gutter construction progresses quickly on this job—with Blaw-Knox Steel Forms

Smooth steel transfers its even surface to the concrete—a good looking job which requires no hand finishing.

Easy handling; quick form setting; perfect alignment; the use of unskilled labor—all contribute to the great economy which quickly pays for your set of Blaw-Knox STEEL FORMS.

You'll be further ahead financially by using Blaw-Knox STEEL FORMS for building concrete curbs, combined curb and gutter, integral base and curb, sidewalks, etc.

Send for your copy of Bulletin No. 1258—Blaw-Knox Street and Sidewalk Forms.

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Road Forms · Ord Road Finishers · Batcherplants · Weighing Batchers · Volume Batchers · The Cementank · Bulk Cement Plants · Wagon Graders · Steel Forms for Streets and Sidewalks · Truck Turntables · Nu-Method Finish Grader · The Inundation System · Clamshell and Dragline Buckets · Ready Mixed Concrete Plants · Truck Bodies.

LOWER *dirt moving costs*

5 IN 1 — *dirt moving requirements* — MACHINE

Send for a copy of Bulletin No. 1210

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for HEAFEY-MOORE CO.,
OAKLAND. CALIFORNIA

"In 1929 we purchased our first Blaw-Knox WAGON GRADER and some months later, bought another.

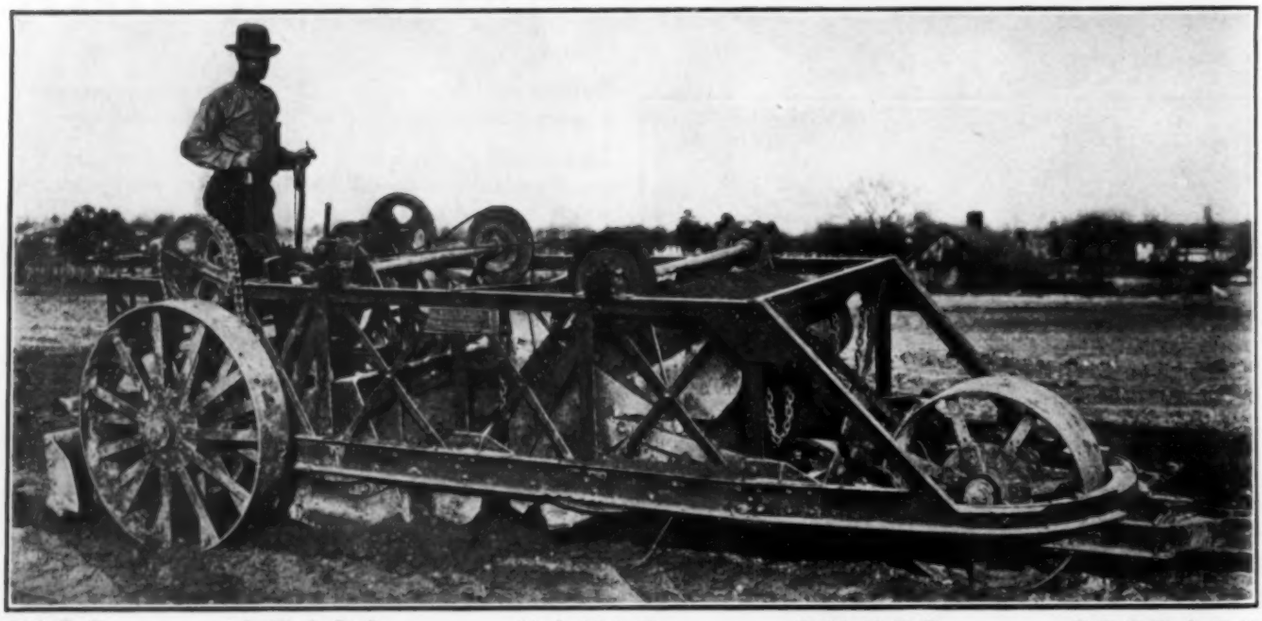
Much of our grading work consists of street and highway road grading, which we term "light grading" as it consists of light cuts and fills, generally, scattered over large areas and widely separated jobs and has to be kept down to a minimum measurement of fine grading. This type of work is always expensive and it is on this kind of dirt moving that we have found the Blaw-Knox WAGON GRADER especially valuable.

For shouldering and drifting, hauling of dirt up to 1500 feet, spreading and compacting of dirt on fills and hauling dirt up grades, we believe that the Blaw-Knox WAGON GRADER cannot be surpassed. This is based both from a standpoint of cost and getting out the yardage.

We are more than pleased with this equipment."

Timken Roller Bearing Equipped

the WAGON GRADER



DIGS -- LOADS -- HAULS -- DUMPS -- SPREADS

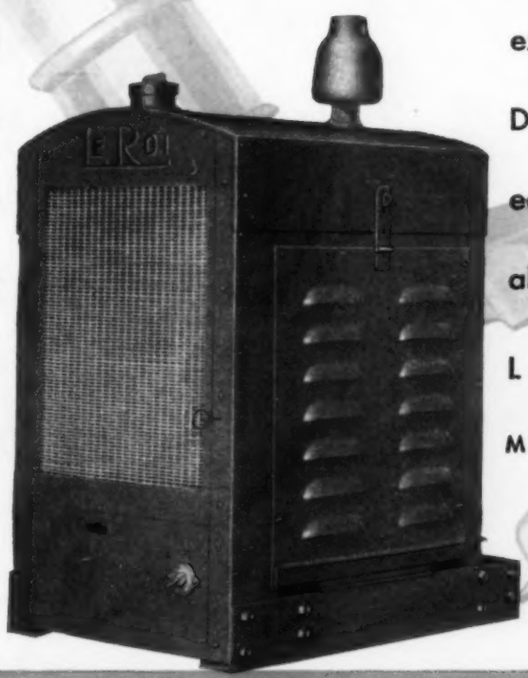
BLAW-KNOX

Road Forms — Ord Road Finishers — Batcherplants — Weighing Batchers — Volume Batchers — The Cementank — Bulk Cement Plants — Wagon Graders — Steel Forms for Streets and Sidewalks — Truck Turntables — Nu-Method Finish Grader — The Inundation System — Clamshell and Dragline Buckets — Ready Mixed Concrete Plants — Truck Bodies

get GUARANTEED PERFORMANCE

from LEROI powered equipment

Protect yourself now by demanding LeRoi power on your equipment. It is the recognized dependable, non-stop power throughout numerous fields . . . and there's a reason . . . LeRoi puts quality into their engines by using only the very highest grades of materials. Then LeRoi engines undergo shop tests that are as severe as the toughest work an engine would ever be called upon to handle in the field. As a result LeRoi can and does give you an iron bound guarantee on every crankshaft for the life of the engine. Insist on LeRoi power and you put the skids under lost time troubles and excessive power costs . . . Demand this power on your equipment . . . it is dependable and proven . . . . .



LEROI COMPANY

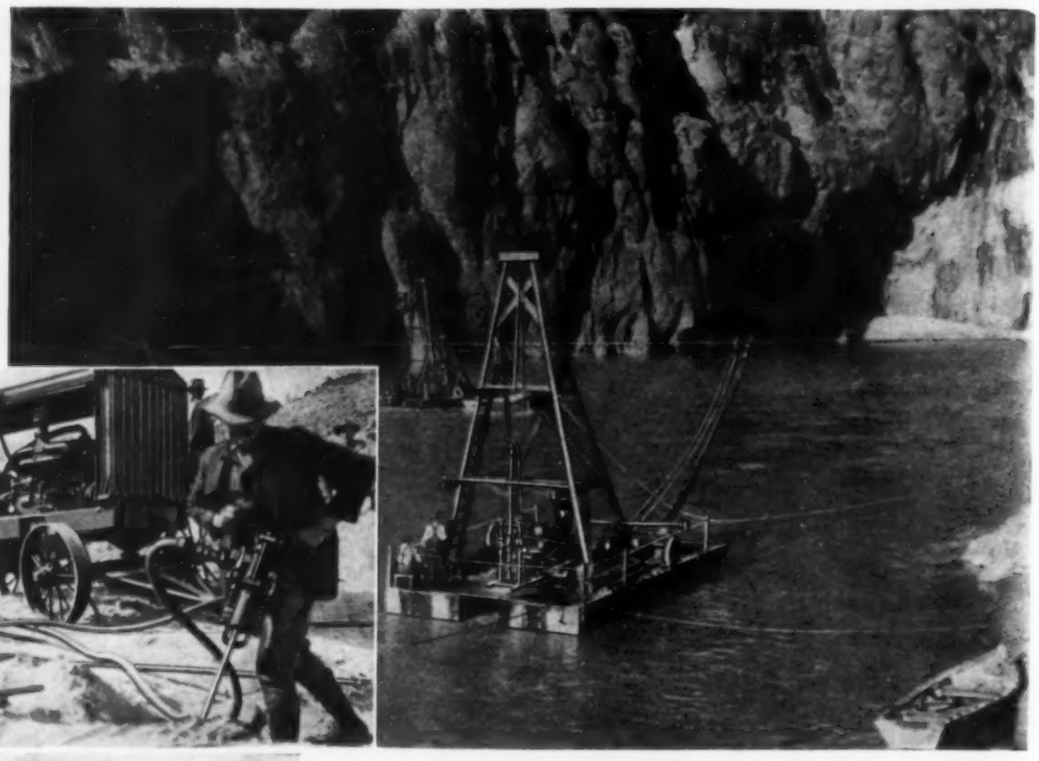
MILWAUKEE, WISCONSIN

LE ROI ENGINES

FOR DEPENDABLE POWER

Air Power goes to work on Hoover Dam

The large picture was taken when Sullivan core drills proved Black River Canyon the ideal site for Hoover Dam. Cores produced by the drills showed the site to be safe, and the rock easy to excavate. Insert shows initial drilling for the pioneer road to the site, and the Sullivan compressor which is now at work in the blacksmith shop.



Sullivan Diesel-Driven Balanced Angle Compressor on the pioneer road at Hoover Dam.

SULLIVAN Again with the Leaders

The first two contracts for construction on Hoover Dam, since Sullivan Core Drills picked the site, are now under way.

R. G. Le Tourneau is building the pioneer road to the dam site. He is using two Sullivan Diesel Driven Balanced Angle Compressors to supply air for excavating the rock.

For operating sharpeners and other equipment in the blacksmith shop, Mr. Le Tourneau uses a Sullivan 220-ft. Portable Compressor.

General Contracting Company, the other contractor, is clearing a place for the terminal station of the power line which is being brought in from Victorville, California, about 220 miles away. About 1500 yards of solid rock will be excavated, and General Contracting Company also is using a Sullivan Portable Compressor.

Sullivan Catalogs on Request.

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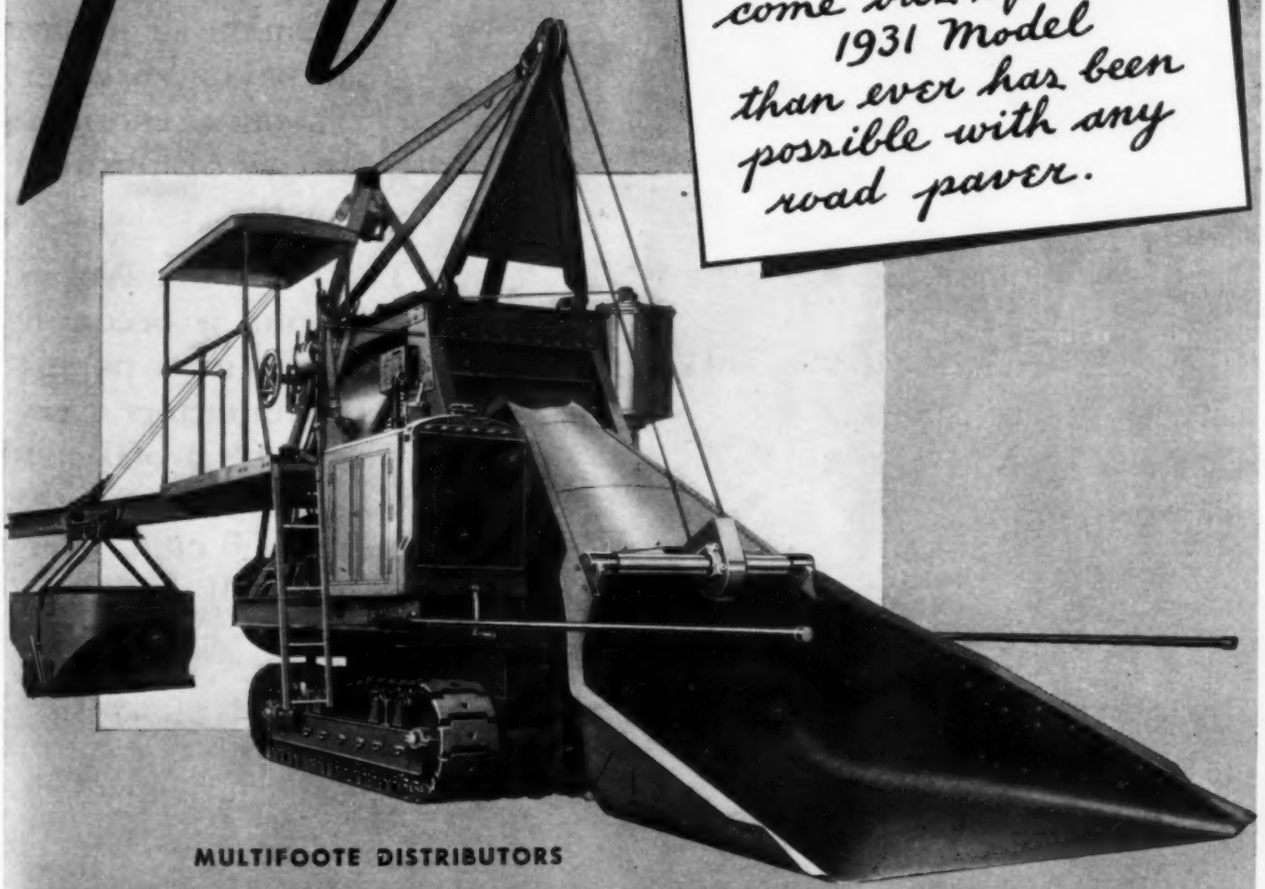
Refinements!

-More profits will come out of this 1931 Model than ever has been possible with any road paver.



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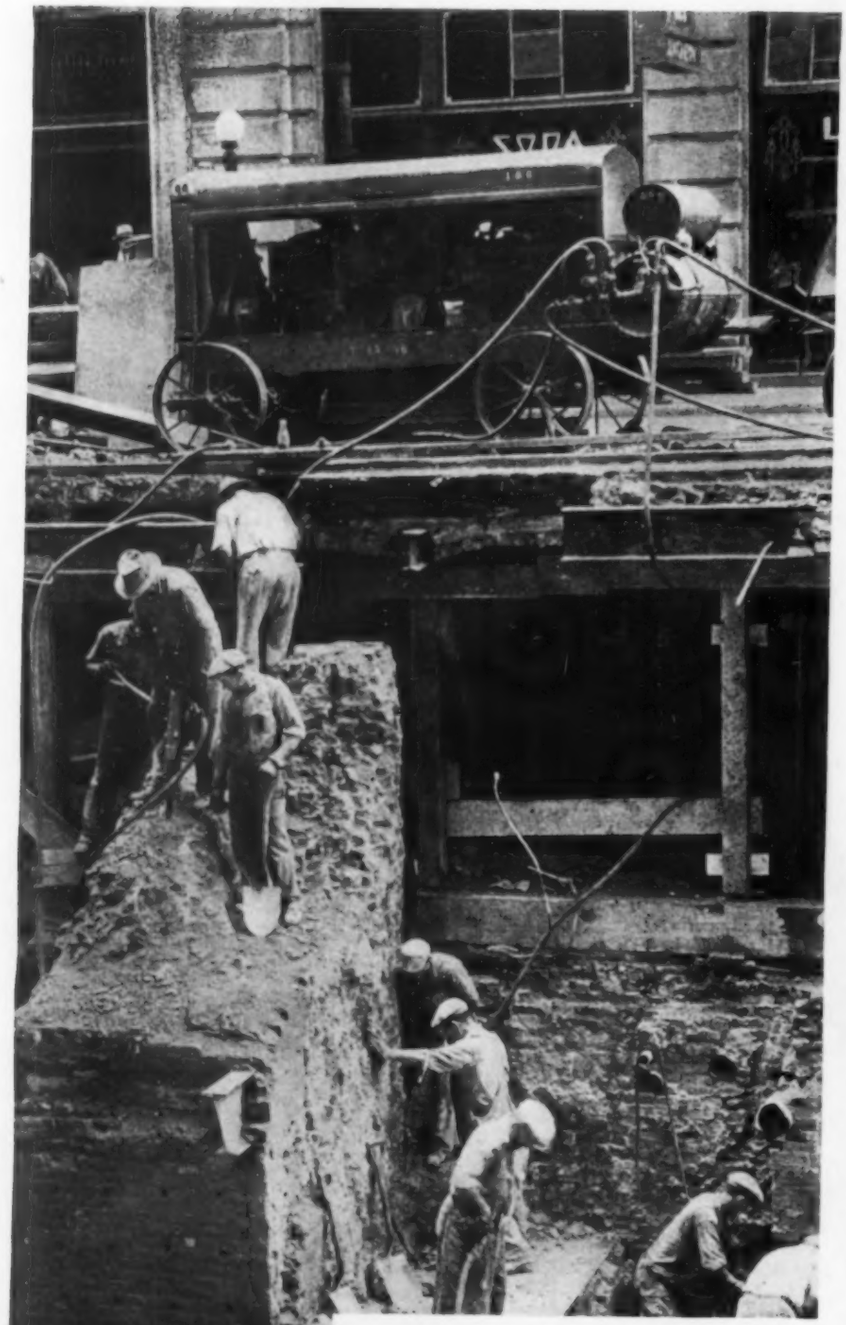
London Concrete Machinery Co.

THE FOOTE COMPANY, INC., OF NUNDA, N. Y.

• • World's Largest Exclusive Builders of Road Pavers • •

IT'S A Schramm...



... a big No. 360 operating five pavement breakers on building excavation job at Newark, N. J.

Give 'em the air and five good paving breakers can rip out an enormous quantity of masonry such as this.

That's why the No. 360 Schramm is becoming more and more popular with contractors everywhere. It's a 360 cu.ft. Compressor ... and that means 360 cu.ft. every minute, all day, every day.

Let us tell you all about this hard-hitting Schramm ... and the lighter members of the Schramm family, too. Send for the complete catalog.

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Profits Come from Speedy Completion of Contracts

LET a Link-Belt carry the burden of making a profit on your next job. More yardage per day—less expense for operation and upkeep. Speedy, powerful, mobile and absolutely dependable. The *extra margin* of reserve brings it through every time on the tough jobs. Gas, Diesel or electric operated. Readily converted to any of nine boom assemblies. From ¾ to 2½ yd. capacity, heavy duty service. Send for book No. 1095 for full particulars.

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SHOVELS · CRANES · DRAGLINES

Great Eastern Gravel Corporation

GRAVEL AND SAND PRODUCTS

PORT JEFFERSON N. Y.

THE HITCHCOCK COMPANY, Inc.
461 Park Square Bldg.
Boston, Mass.

Gentlemen:-

We operate a large suction dredge, with 20" centrifugal pump, for the production of commercial sand and gravel. Approximately 500 cubic yards of solid materials per hour is discharged with considerable force onto a spreading table.

Our materials are quartz formation and unusually abrasive. This spreading table has heretofore been covered with 1/4" steel plate, lasting 3 to 4 weeks. Four months ago we covered the table with your Colvulc nearly 1/2" thick. It shows no wear whatsoever and will apparently last for years.

Our expense for steel plate was about $4,000 per year and we feel safe in stating Colvulc will show a saving of 60 to 75% if it wears but a year, which is very conservative.

Very truly yours,

GREAT EASTERN GRAVEL CORP.

Vice President

COLVULC

SAVES $3,000 ▶▶▶ YEARLY FOR GREAT EASTERN GRAVEL CORP.

Port Jefferson, N. Y.

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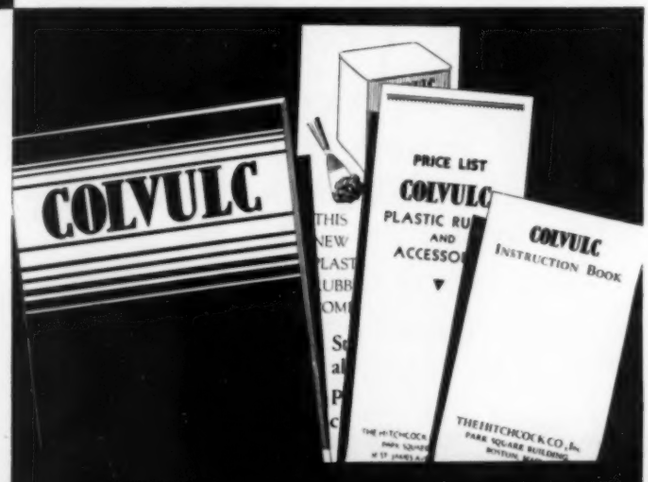
SEND FOR THIS MATERIAL ▶▶▶

Find out how

COLVULC

can solve equally tough abrasion problems on your conveyor equipment



COLVULC is a tough, plastic rubber compound for surfacing conveyor belts, chutes, hoppers, etc. The booklet, instruction manual, and price list above explain fully what COLVULC is, how it works, why it *saves*.

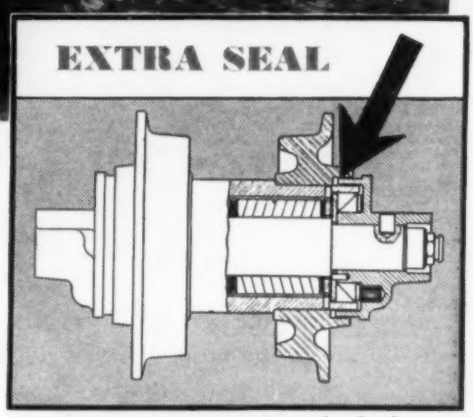
COLVULC PLASTIC RUBBER COMPOUND

ALSO PROTECTS TANKS FROM ACID CORROSION

As a coating for tanks of all types, "ACID COLVULC" successfully resists the corrosive action of many acids and alkalies.

Your own workmen can apply COLVULC quickly and easily. Write now for the complete, descriptive material.

The HITCHCOCK COMPANY, Inc.
Park Square Bldg., Boston, Mass.



Cross section through truck wheel

Built for a Long, Hard Life

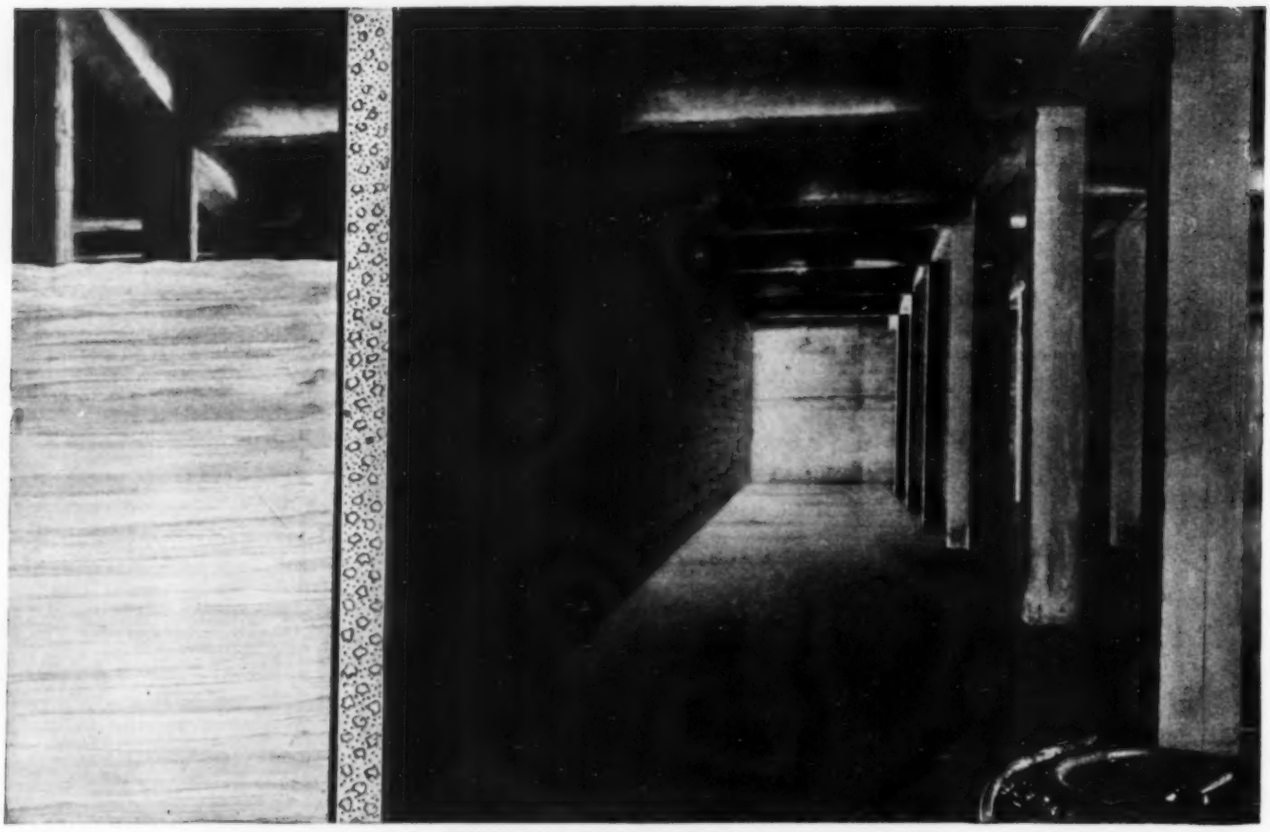
Skilled Engineering combined with correct materials makes it possible for Allis-Chalmers tractors to live long and serve well under conditions like that illustrated. The *dirt-sealed* truck wheel construction is one of many features built into these tractors to combat mud, sand, dust and other severe operating conditions.

A free trial
on your job
Ask your Dealer

Monarch "75," "50" and "35" track-type tractors. Model "U" wheel and track-type tractors and power units

ALLIS • CHALMERS • TRACTORS

SPRINGFIELD, ILLINOIS · · · MILWAUKEE, WISCONSIN



New reservoir at Kankakee, Illinois. Burnip Construction Co., Columbus, Ohio, contractor

A 12-foot head of water on one side, bone-dry on the other

In the new city reservoirs at Kankakee, Ill., the observance of the principles of modern concrete design insured more watertight concrete. The design for this concrete limited the amount of mixing water to seven gallons per sack of cement. Proper proportioning of local aggregates enabled the contractors to maintain a plastic, easy-to-place mix at all times. Collection of large quantities of water on the surface of the concrete during the placing operation was avoided and no laitance was permitted to form. After placing the concrete, the walls were kept damp to insure proper curing.

Such methods of mixing and placing do not increase costs. They result not only in increased watertightness but in stronger, more durable concrete as well. A booklet containing in detail these quality concreting methods and average results that may be expected with Universal or Atlas portland cement will be furnished on request.

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Concrete for Permanence

Universal Atlas Cements

Construction Methods

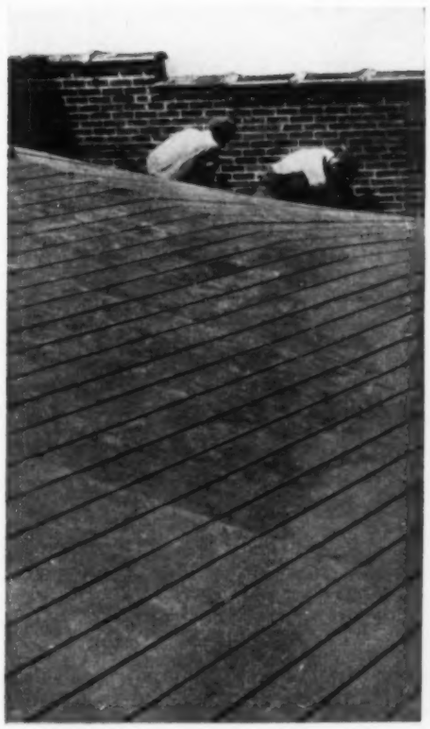
A McGraw-Hill Publication—Established 1919

ROBERT K. TOMLIN, *Editor*

VOLUME 13 NEW YORK, APRIL, 1931 NUMBER 4

Steel Sheet Deck Forms

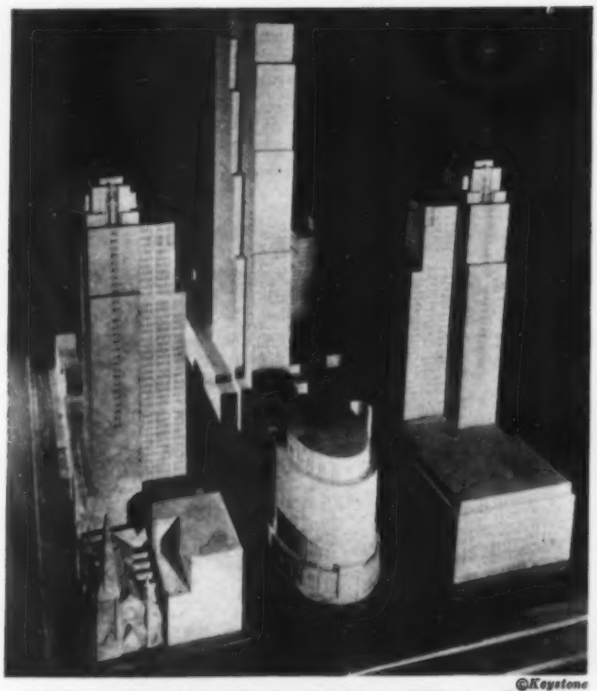
"WHALEBACK" ROOF



POSSESSING sufficient flexibility to enable it to conform to a warped surface without pre-curving at the factory, steel sheet decking has been used to form a "whaleback" roof for the Paramount Theatre in Fort Wayne, Ind. The main difficulty that had to be overcome was in the installation of the roof. The steel deck of Holorib sheets, with triangular rib stiffeners, is attached to the purlins or structural steel roof members by clips or by welding, so that the ends of the sheets must make direct contact with the purlins. On a flat or a sloping roof, where purlins are horizontal and parallel, this is a simple operation, but for a curved or dome type of roof the distance between purlins is variable and must be accurately computed so that the sheets may be cut to precise lengths. At the Paramount theatre, the distance between purlins on a horizontal line at the wall is 7 ft. and at the peak of the dome 7 ft. 9 in. To the completed steel deck a built-up riifing was applied.

The contractors on the Paramount Theatre were Max Irmscher & Sons, of Fort Wayne. A. M. Strauss was the architect.

This Month's "News Reel"



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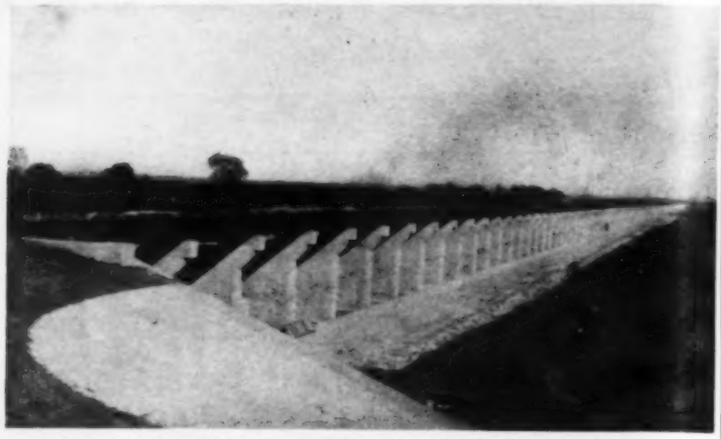
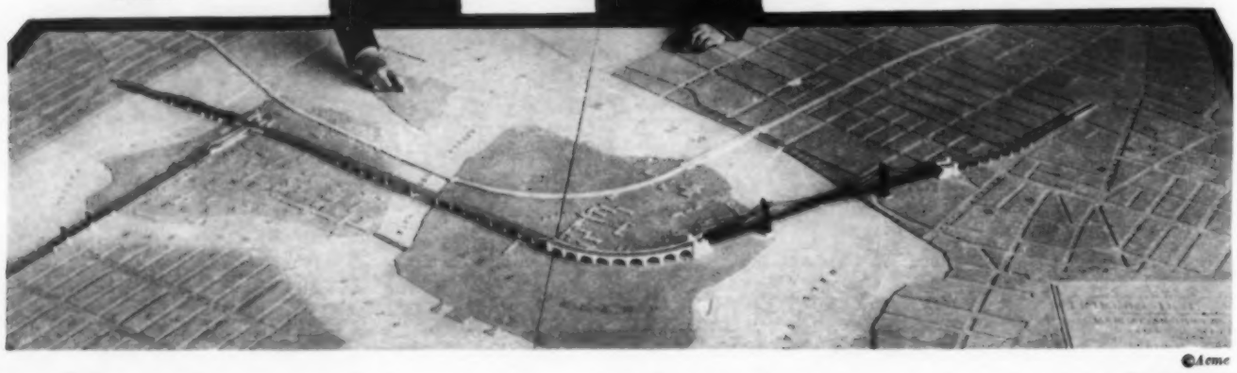
MODEL OF GIGANTIC "RADIO CITY." Group building project, involving 125,000 tons of steel will occupy three full city blocks, each 200x600 ft. along Fifth Ave., New York. Central unit for Radio Corp. of America is 68-story structure with 2,000,000 sq.ft. of rentable floor space. Unusual features include a 14-story elliptical building, two theatres, opera house and two 45-story office buildings. Todd, Robertson & Todd Engineering Corp., is in charge of the project for John D. Rockefeller, Jr., the owner.



SAFETY VALVE *(above)* for Mississippi floods. Bonnet Carré spillway, above New Orleans, is concrete weir and needle dam 7,698 ft. long built by Stevens Bros. & Miller-Hutchinson Co.—*Photograph from* W. A. WELLS, *area engineer U. S. Engineer Office, New Orleans.*

TRIBOROUGH BRIDGE *(below)*, New York, illustrated by model which is being examined by Commissioner Albert Goldman and Chief Engineer Edward A. Byrne of Dept. of Plant and Structures.



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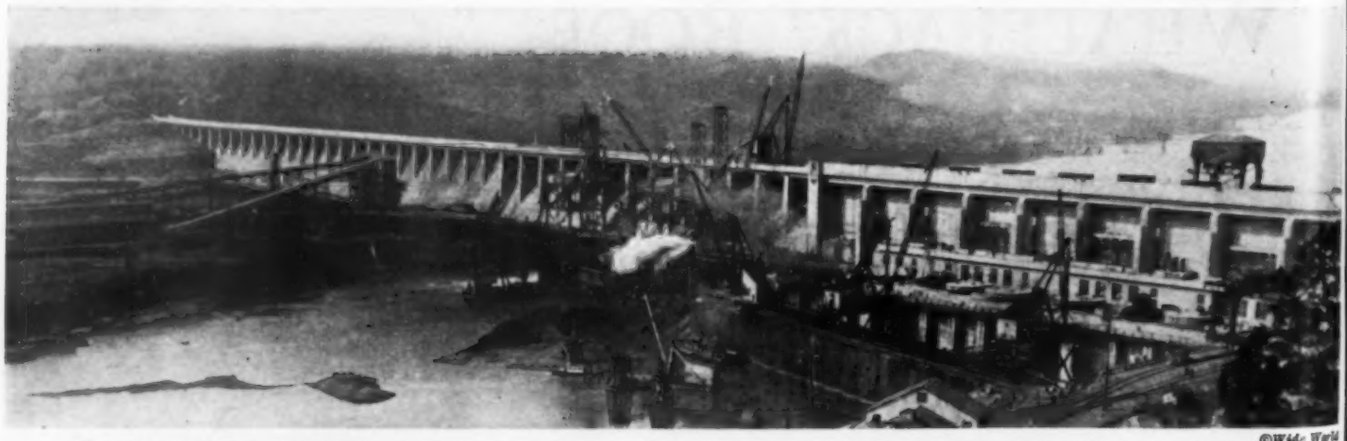

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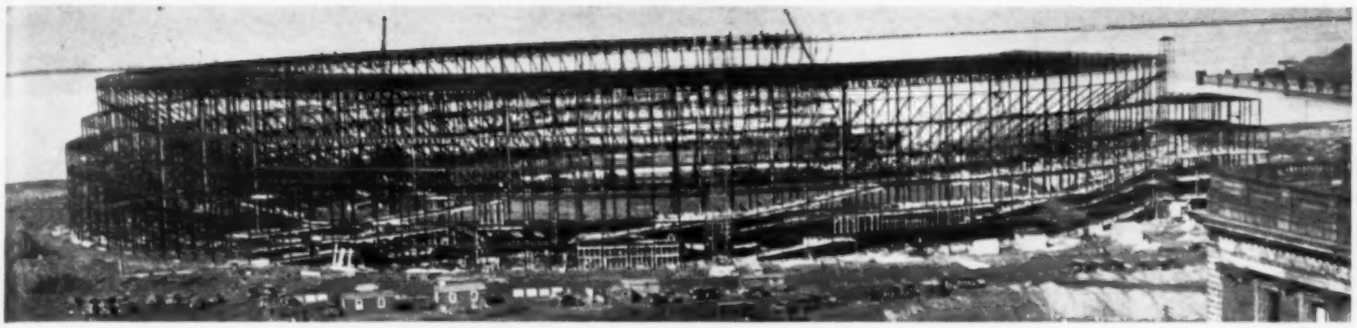
BAGNELL DAM COMPLETED. For Union Electric Light & Power Co., concrete structure 2,543 ft. long and 148 ft. in maximum height, has been built across Osage River, Missouri, by Stone & Webster Engineering Corp. Contract signed Aug. 5, 1929; last sluiceway closed Feb. 19, 1931. Concreting progress ran as high as 113,000 cu.yd. per month. Cellular sheet-pile cofferdams and steel construction bridge carrying three standard-gage railway tracks and 40-ft. gage track for gantry travelers handling concrete were features.



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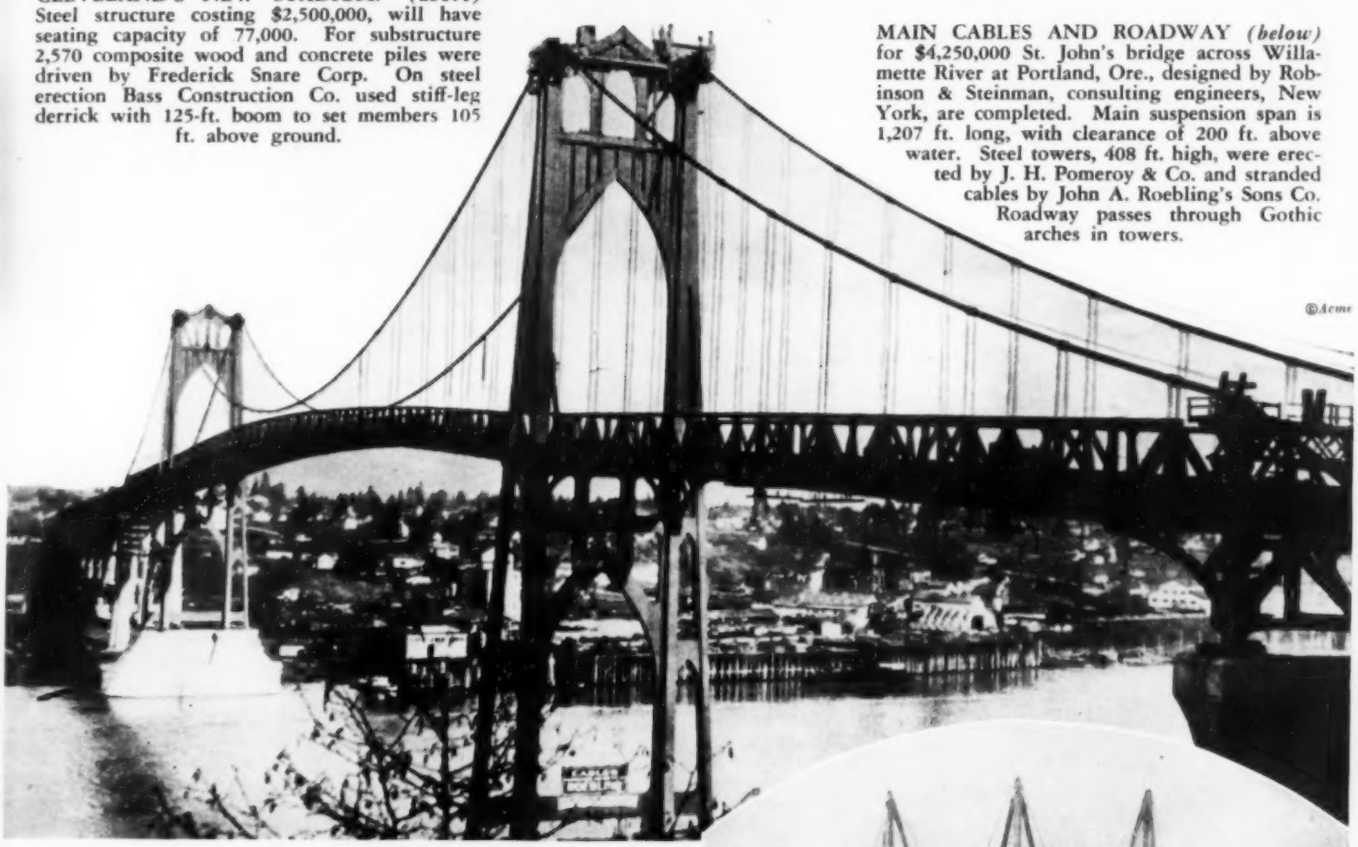
CLEVELAND'S NEW STADIUM. *(above)* Steel structure costing $2,500,000, will have seating capacity of 77,000. For substructure 2,570 composite wood and concrete piles were driven by Frederick Snare Corp. On steel erection Bass Construction Co. used stiff-leg derrick with 125-ft. boom to set members 105 ft. above ground.

MAIN CABLES AND ROADWAY *(below)* for $4,250,000 St. John's bridge across Willamette River at Portland, Ore., designed by Robinson & Steinman, consulting engineers, New York, are completed. Main suspension span is 1,207 ft. long, with clearance of 200 ft. above water. Steel towers, 408 ft. high, were erected by J. H. Pomeroy & Co. and stranded cables by John A. Roebling's Sons Co. Roadway passes through Gothic arches in towers.



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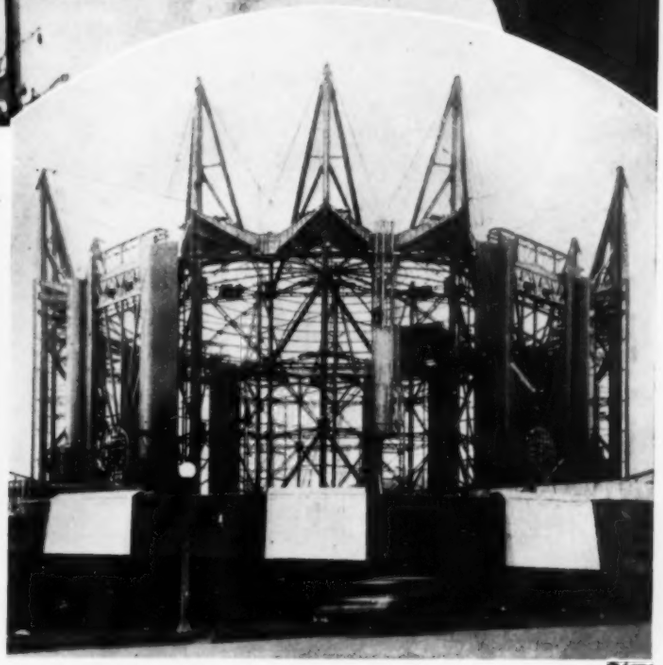
HOOVER DAM CONTRACT SIGNED. Secretary Ray L. Wilbur, Department of Interior, awards $48,890,995 job to Six Companies, Inc., a group of Western contractors. Congressman Philip D. Swing *(left)* and Commissioner Elwood Mead, *(right)* of Reclamation Bureau.



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ROOF SUSPENDED BY CABLES between columns will be feature of Travel and Transport building unit for Chicago World's Fair, under construction by John Griffiths & Son Co., contractor. Columns 150 ft. high are guyed to heavy concrete anchorages supported by clusters of 20 piles. Domed roof, 206 ft. in diameter, will be surfaced with insulated steel decking.

PRECAST CRIBBING

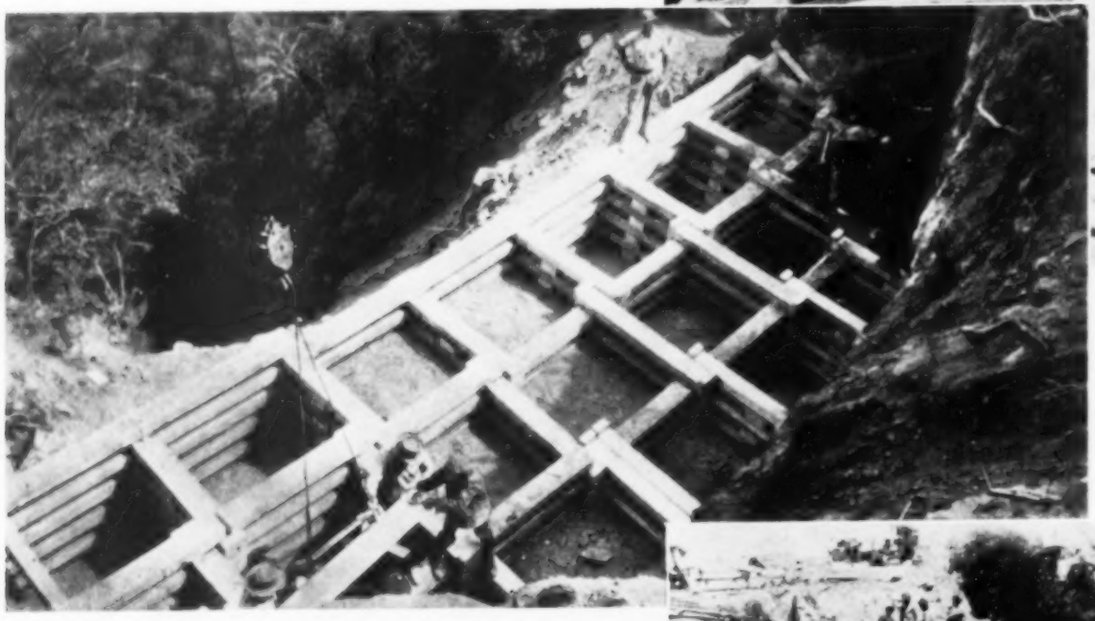
Retains Mountain Road

By A. N. GEORGE
Resident Engineer,
California Dept. of Public Works.

CRIB retaining walls of precast reinforced-concrete members support portions of the La Canada-Mt. Wilson scenic highway in mountainous California country with slopes of 45 deg. Topographic conditions made it necessary to build the road almost entirely in cut. In order to preserve the appearance of the route and to prevent the destruction of vegetation below grade, the state highway department's specifications provided that excavated material instead of being overcast, should be hauled to ravine crossings where fills could be constructed.

The method of construction with precast crib members was chosen to meet special conditions of remote location and rough topography. With this method excessive excavation was avoided and required standards of alignment maintained.

PRECAST MEMBERS *(above)* **for crib 35 ft. high on 300-ft. radius curve are lowered by hook from truck crane.**



ONE, TWO and THREE-CELL WIDTH *(above)* **is used, depending upon the height of the retaining wall. ANCHOR MEMBERS are in place in illustration at right.**

The designs called for a 26-ft. roadway, with 2-ft. side ditches. For curves a minimum radius of 200 ft. and for gradients a maximum of 6 per cent were specified. For building the first 2.65-mile unit of this road contract was awarded to the H. W. Rohl Co., of Los Angeles.

The contractor excavated all of the roadway with 1¼-yd. gasoline shovels before building any of the crib walls. Sixty per cent of the material (disintegrated diorite) was loosened with ½ lb. of black powder per cubic yard. All drilling was done with Ingersoll-Rand jackhammers, and no coyote holes were allowed.

The plan of operation was to make the first power

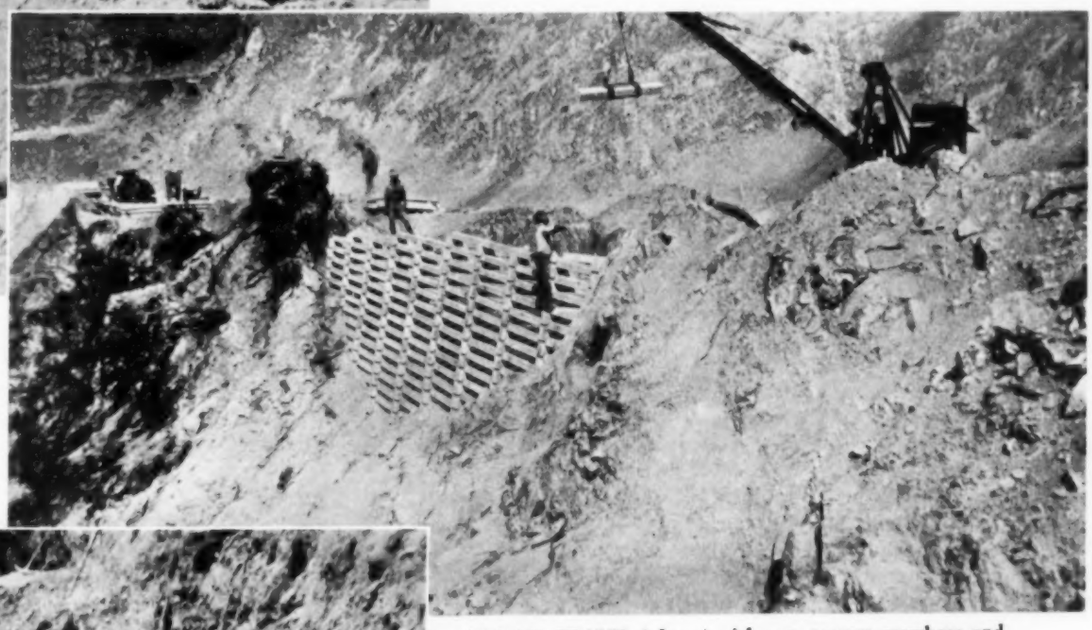
SLIDE *(above)* of 4000 cu.yd. of material shoves 1¼-yd. power shovel to edge of 200-ft. cliff and partially buries it.

shovel cut as high up on the slopes as practicable, and then make succeeding cuts in 15-ft. lifts. Thus, it was possible to cut true to section and reduce the hand sloping to a minimum. Except for the use of very large bodies without tail gates on the trucks, there was nothing novel in the grading operation.

For building the reinforced concrete cribs, the precast members were in all cases 6 ft. long. One header and one stretcher gave a combined thickness of 11 in. The members were placed in cells 6 ft. square, and the walls were built one, two or three cells wide, depending on the height of wall.

The precast members were supplied by the Massey Concrete Products Corporation. At first it was planned to place the wall on footings constructed of precast stretchers, but actually it was found preferable to cast the footings in place. The specifications required that any lack of uniformity between the members should be taken care of by inserting roofing paper in the joints, but it was found far more satisfactory to use very soft cement mortar in the joints, allowing the members to bed themselves.

A clamshell bucket on a P & H shovel made the rough excavations for the walls and they were trimmed by hand. Forms were placed for the concrete footings and they were poured in place. The precast members were then lowered into place by a Universal truck crane. The crew consisted of crane operator, truck operator, two men on top hooking members on, one man mixing mortar, and a foreman and four men



TRUCK CRANE *(above)* picks up precast members and lowers them to place in crib retaining wall. EXCAVATING *(left)* troughs for anchors.

receiving the members and placing them. Under favorable conditions, this crew placed 58 members per hour, but it was never possible to place members continuously.

The cribs were backfilled with selected material placed in 8-in. layers and hand tamped.

The advantages of this type of wall are: First, it can be backfilled as soon as built; second, it is inconceivable that any degree of hydrostatic pressure can be developed behind a wall of this type; third, the wall is good looking and may be planted with vines and shrubbery; fourth, it is claimed that this type of wall can absorb some foundation settlement without serious results.

MOBILE DRILLING BRIDGE is steel truss 82 ft. long spanning canal and carrying three drills mounted in leads that can be moved transversely. Ends of truss are carried by wheel trucks operating on 24-in. gage track.

VERTICAL LEADS, movable transversely, are hung on truss to carry three drills. Drills are raised and lowered by air hoists.

Truss, Spanning Canal, Serves as

DRILLING BRIDGE

Mittry Bros., on Rock Excavation for Minidoka Project, Devise Mobile Carrier, 82 Ft. Long, for Three Drilling Units

J. K. ROHRER, associate engineer, U. S. Bureau of Reclamation, was in immediate charge of the work.

UNUSUAL methods of rock drilling, involving the use of a traveling bridge truss 82 ft. long for carrying three drills mounted on movable leads, were developed by Mittry Bros. Construction Co., Los Angeles, in handling their recent contract on the Milner-Gooding irrigation canal in southern Idaho for the U. S. Bureau of Reclamation. Extensive sections of this canal, with a 26 ft. wide base, required excavation into basaltic lava rock for the lower 4 to 8 ft. of the canal depth. This rock work, which followed earth stripping with draglines, required a drilling method that would permit the use of mobile equipment capable of large scale production.

The entire project, of which the Mittry Bros. contract covered 27 miles, involves the construction of a 65-mile canal which will convey water from the Snake River to about 35,000 acres of raw land, and 45,000 acres now receiving only a partial supply from the Big and Little Wood Rivers. The total excavation work completed prior to 1931 involves about 6,200,000 cu.yd., which includes approximately 20 per cent of rock work.

Earth excavation methods were practically standard and included, for the most part, draglines of 2- and 2½-yd. rating, equipped with oversize buckets of from 3- to 3½-yd. capacity. These machines proved effective and economic earth movers, operating 24 hours a day with crews consisting of operator, oiler, and cleanup man. Most of the machines were driven by Diesel engines. Where the canal location included only earth excavation, the machines completed the entire canal with the exception of occasional bank trimming by smaller power units. Average excavation per shift for a 2½-yd. dragline in ordinary earth was about 1,000 cu.yd.

For extended sections, however, the location of the canal route was such that the upper part of the excavation work was in earth and the lower part in the lava rock. The Mittry contracts involved extended sections in this type of excavation. This condition necessitated the stripping of the earth by dragline as the first step in the work to be followed by the removal of the solid rock to bottom grade. The earth

THREE PORTABLE COMPRESSORS supplied air to drills on truss bridge built of lumber by contractor who later installed a second bridge of steel members.

THE FOUR MITTRY BROTHERS, contractors of Los Angeles, who built 27 miles of the Milner-Gooding main canal on the Minidoka project.

was used to form the canal banks and the excavated rock was wasted over the canal banks. Methods developed for the rock excavation under these conditions proved one of the most unusual features of the project.

Experience soon demonstrated that to shoot the rock off a face as excavation advanced would prove neither effective nor economical. The alternative was to drill vertical holes along a section of the canal and shatter the rock for handling by the excavator buckets.

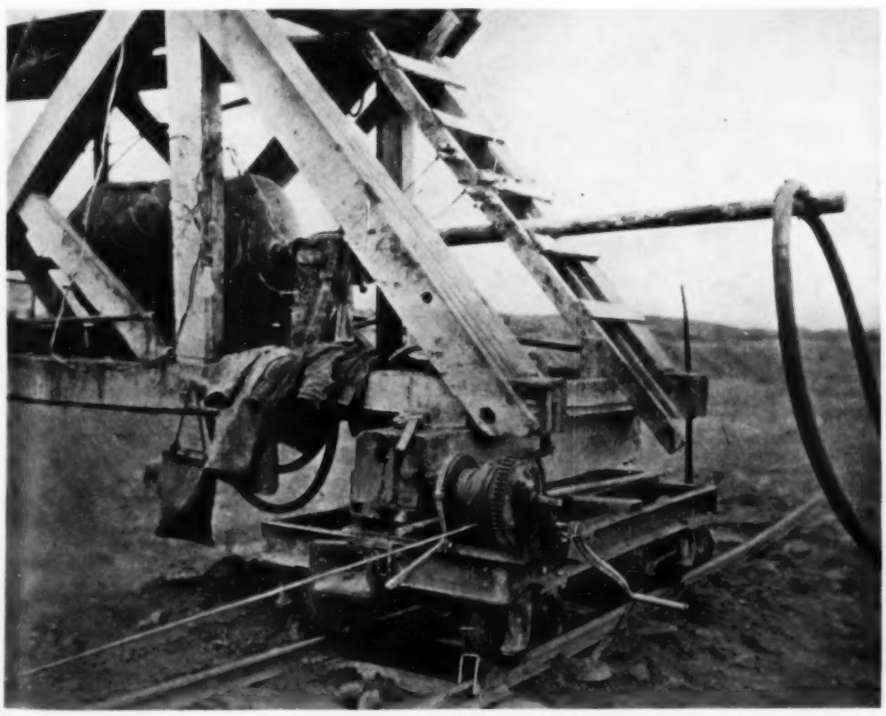
The vertical holes were drilled at 4-ft. spacing in both directions in cuts less than 8 ft. deep and the spacing was increased to 8 to 12 ft. in deeper cuts. Holes were drilled approximately 4 ft. below bottom grade in the canal.

The major problem was to devise mobile equipment for this extensive drilling program. The original scheme of the contractor was to mount three Ingersoll-Rand R-72 drills on a Best "30" tractor at 4-ft. spacing. These drills were supported in leads held on a rigid frame welded to the tractor frame. Each drill was raised and lowered by an Ingersoll-Rand Little Tugger air hoist. This arrangement was successful and extremely mobile, but did not have a capacity sufficient for the quantity of work required.

As a further step which proved unusually successful, the contractor built, out of scrap lumber on the job, a wooden truss which could span the canal banks and carry the drills. The ends of this truss were mounted on trucks and moved along the canal banks on 24-in. gage tracks. On this truss were mounted three Ingersoll-Rand quarry drills, each equipped with an air hoist to handle vertical movement. Lateral movement along the truss was done by hand as the drills were mounted on the truss in leads on rollers. With this arrangement a row of holes at any given spacing could be drilled rapidly and the truss moved forward by a hand windlass to the next spacing without loss of time. This device proved so successful that the contractor had a similar truss built of structural steel, having a length of 82 ft. and a width of 6 ft. The steel truss carried three Denver-Gardner drifter drills and each was equipped with an Ingersoll-Rand air hoist. This truss also carried a Kohler light plant.

The compressed air for the drills on each truss was supplied by three Ingersoll-Rand 310-cu.ft. portable gasoline compressors which were attached to an air line leading to receiver tanks on the truss. No water was used in drilling, but an additional air line was used on the drills to supply sufficient air for cleaning the hole.

Immediately behind the drilling crew the holes were loaded. For rock depth of more than 8 ft. it was the practice



FOUR-WHEEL TRUCKS, operating on 24-in. gage track, made drilling bridge mobile. Truss was shifted along canal by cable from hand windlass. Note air receiver carried at end of truss.

to chamber the holes from one to three times. Forty per cent gelatin powder was used on most of the work. Blasting procedure often involved the firing of as many as 3,000 holes at a time requiring 57,000 lb. of powder and shattering the rock along a 500-ft. length of canal.

Use of dragline equipment for large scale excavation in this blasted lava was an unusual feature of the work. The particular advantage of a dragline for this work was the fact that the size of the canal required a throw longer than could be made by ordinary shovels. For this rock excavation work the oversize dragline buckets proved very effective in loading the unevenly broken rock. The long reach of these machines readily permitted wasting the material from average cuts. On one of the contracts a Marion electric shovel with a 55-ft. boom and 35-ft. dipper stick was used. This machine was driven by a 350-hp. Fairbanks-Morse Diesel engine, mounted on a skid and moved behind the shovel in the canal. Additional excavating units used by the contractor were: two Bucyrus diesel draglines with 60-ft. booms and two 1½-yd. Koehring draglines, one gasoline and one diesel. Also, at one point on this contract the proximity of an electric power transmission line permitted the use of a Bucyrus electric dragline with a 5-yd. bucket on a 125-ft. boom. Rock excavation on the two principal contracts of this company totaled approximately 720,000 cu.yd.

The project of which this contract was a part is being built by the U. S. Bureau of Reclamation under the direction of Dr. Elwood Mead, commissioner, and R. F. Walter, chief engineer. E. B. Darlington, superintendent of the Minidoka project, is in general charge of the Gooding Division program and J. K. Rohrer, associate engineer, was in direct charge of the contract described. Four brothers are members of the Mittry Bros. Construction Co.: F. K. Mittry, president; O. K. Mittry, S. K. Mittry, secretary and A. K. Mittry.

TRACTOR-MOUNTED DRILLS carried in three vertical leads were used at first before the movable truss bridges were placed in service. Air hoists raise and lower drills in leads. Note wood blocking to bring drill leads vertical on sloping ground.

ELECTRIC DRAGLINE *(below)* with 125-ft. boom handling 5-yd. bucket, removed blasted rock behind drilling outfits. Power was obtained from a nearby commercial transmission line.

ELECTRIC POWER SHOVEL *(left)* for removing broken rock from canal prism has special 55-ft. boom and 35-ft. dipper stick for overcasting to banks alongside. Power is supplied by diesel-electric plant *(at right)* housed and mounted on skids for moving along with the shovel.

FIRING LINE WELD on 732-mile pipe line between Oklahoma oil fields and refineries in Ohio and Pennsylvania.

CHILL BANDS

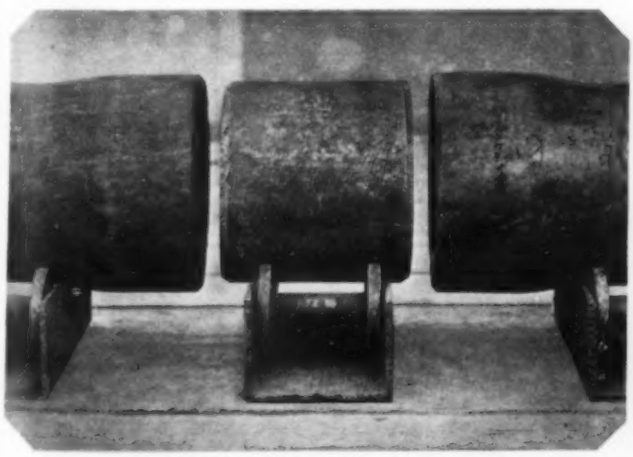
Strengthen Arc-Welded Joints on Double-Bell Pipe

ELECTRICALLY welded chill band joints on 40-ft. lengths of 10-in. double-bell seamless steel tubing are features of the 732-mile pipe line which the Gulf Pipe Line Co., has constructed to transport petroleum products from the Oklahoma oil fields to refineries in Ohio and western Pennsylvania. As shown in the first of the series of illustrations below, each length of pipe is belled and beveled at both ends, so that the electric weld penetrates through to the chill band to form an exceptionally strong and rigid connection. As the result of a series of tests the Fleetweld process, using a shielded arc in an atmosphere void of oxygen and nitrogen,—a recent development of the Lincoln Electric Co.—was adopted. In addition to possessing strength and ductility, welds made by this process are claimed to be highly resistant to corrosion.

As is customary in pipe line construction, the pipe was lined up in sections for welding and turned as welding progressed. The sections were then rolled over the trench and welded into place on the line. Sections vary in length from 5 to 12 pipe lengths, depending on the terrain.

The method of lining up the pipe on rollers and completing the firing-line weld is illustrated below. Successive views, starting at the left, show the chill band ready for insertion between the belled ends of adjoining lengths of National tubing, the joint ready for welding, and successive stages in the welding process. The first bead (Fig. 3) is made with a $\frac{1}{4}$-in. electrode and is followed (Fig. 4) with a finishing bead using a $\frac{5}{16}$-in. electrode. About 10 minutes are required to complete one of these joints.

When completed, the pipe line will be served by 14 pumping stations. The line will have a working pressure of 700 lb. per square inch and a capacity varying between 35,000 and 40,000 bbl. per day.



1 CHILL BAND in place between belled ends of 10-in. pipe lengths.

2 JOINT ready for welding.

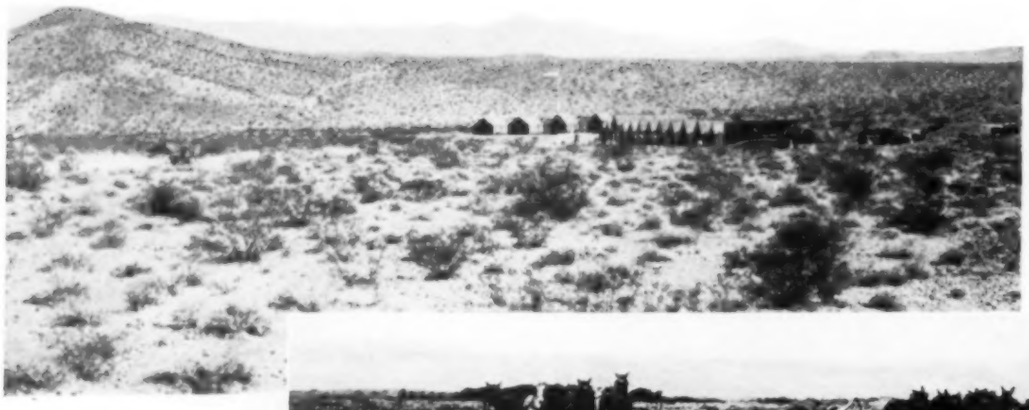
3 FIRST WELDING BEAD completed.

4 SECOND WELDING BEAD completed.

Setting the Stage for Building the

HOOVER DAM

Preliminary Construction Provides Camp Facilities and Access by Rail and Road to Site in Black Canyon of Colorado River



THE BIRTH OF A TOWNSITE *(left)*. Camp in desert near summit of range that slopes 9 miles to river has been established to house construction personnel. Point on hill in line with flagpole top marks western boundary of new townsite.

GRADING OPERATIONS *(right)* for railway require forty head of horses and mules pulling fresno scrapers.

POWER SHOVEL *(above)* on Merritt-Chapman & Scott Corp. contract cuts grade for 23-mile Union Pacific branch railway line between Boulder Junction and new town at Boulder City.

LAST RAIL being placed on Lewis Construction Co. contract for Union Pacific branch line connection with damsite.

WORK STARTS ON HIGHWAY across desert land, linking damsite with town of Boulder City. The work is being done by R. G. LeTourneau of Stockton, Calif., under subcontract with General Construction Co., of Seattle.

ROUGH CROSS-COUNTRY GOING for one of R. G. LeTourneau's power shovels for highway grading.

UNLOADING EXPLOSIVES *(above)* for highway construction. Nevada Transportation Co.'s motor truck delivers last of a 24-ton shipment of Hercules powder.

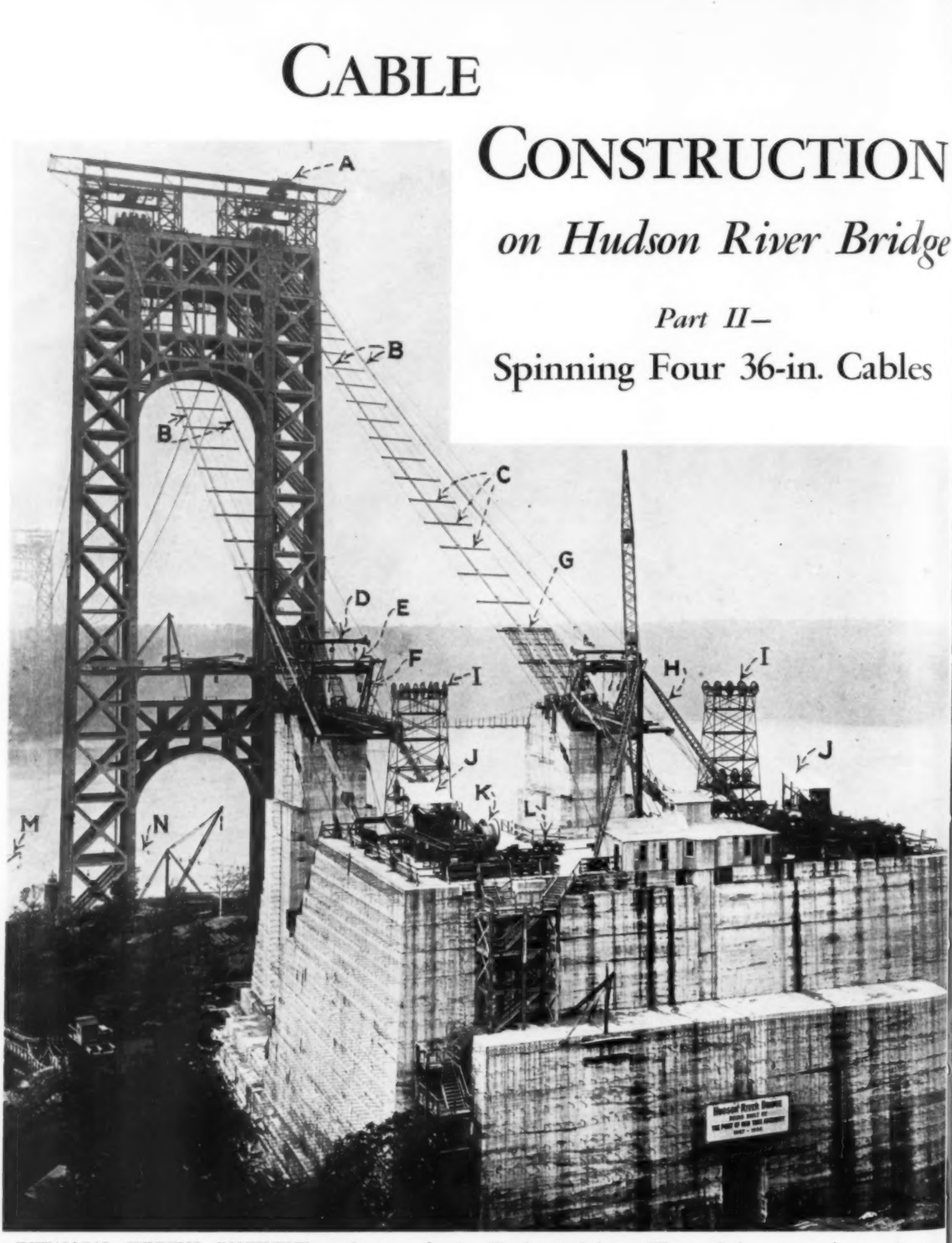
AT THE DAMSITE the U. S. Bureau of Reclamation is measuring the flow of the river and testing the character of rock that will be encountered in the diversion tunnels and dam foundation.

CABLE CONSTRUCTION

on Hudson River Bridge

Part II—

Spinning Four 36-in. Cables



INSTALLING SPINNING EQUIPMENT on New York side. (A) Gantry crane on tower top is to handle completed strands. (B) Two groups of wire ropes support each footbridge. (C) Pipe floorbeams suspended from rope groups carry footbridge deck on side span. (D) Carriage on auxiliary track ropes places footbridge deck sections. (E) Tramway headframe on anchorage pedestal. (F) Structural bent carries trolley jack for handling completed strands into splay casting. (G) Stepped sections of side-span footbridge deck. (H) Stiff-leg derrick for hoisting reels of cable wire from ground to top of anchorage. (I) Counterweight tower. (J) Frames of houses for unreeling equipment and for splicing machines. (K) Two reels mounted for test. When spinning starts, four reels are mounted on each side of anchorage. (L) Track and flat cars for handling reels. (M) Derrick on river bank unloads reels out of special freight cars on car floats. (N) Rope cableway conveys reels between shore and anchorage, across freight tracks of New York Central Railroad. Reels are delivered to ground at front of anchorage.

LAST month's *Construction Methods* depicted the erection of the footbridges for the spinning of the Hudson River bridge cables. This article will describe improvements in equipment and methods which made it possible to operate the spinning wheel at a normal speed of 650 ft. a minute, 250 ft. per minute faster than the greatest previous speed.

The four 36-in. cables of the Hudson River bridge contain 107,000 miles, 28,307 tons of cold-drawn, galvanized wire, 0.196 in. in diameter. Each cable is made up of 26,474 parallel wires. The cable contractor started spinning Oct. 18, 1929, and placed the last of the 105,896 wires on Aug. 7, 1930.

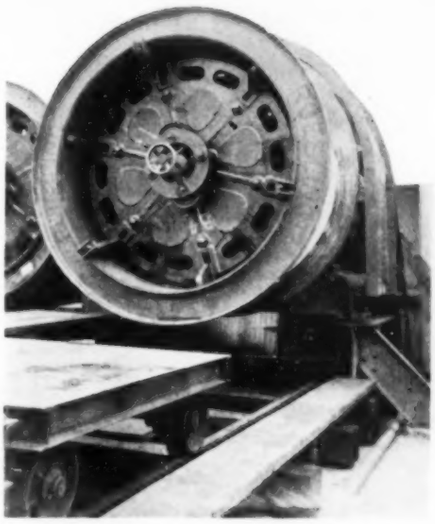
Split Sheaves—The use of special double sheaves to carry the tramway ropes obviated the necessity of offsetting the spinning wheel from the rope and aided high-speed operation. Construction of the double-sheave assembly can best be understood by examining the accompanying photograph which shows a set of sheaves installed on a tower top. Each of the steel tramway bents, 216 ft. apart, along the footbridges, carried a double-sheave unit to support each tramway rope.

A double-sheave rope support consisted of two wheels tilted at an angle to each other and spaced to allow the ¼-in. plate of the spinning wheel connecting frame to pass between them. Each of the two wheels had an outside flange.

Unreeling Machines—On all previous suspension bridges the wire had been unreeled by the spinning wheel. Because of the high-speed desired on the Hudson River bridge, the contractor utilized electrically-driven unreeling machinery and designed equipment which would enable the operator to synchronize the rate of unreeling with the speed of the spinning wheel.

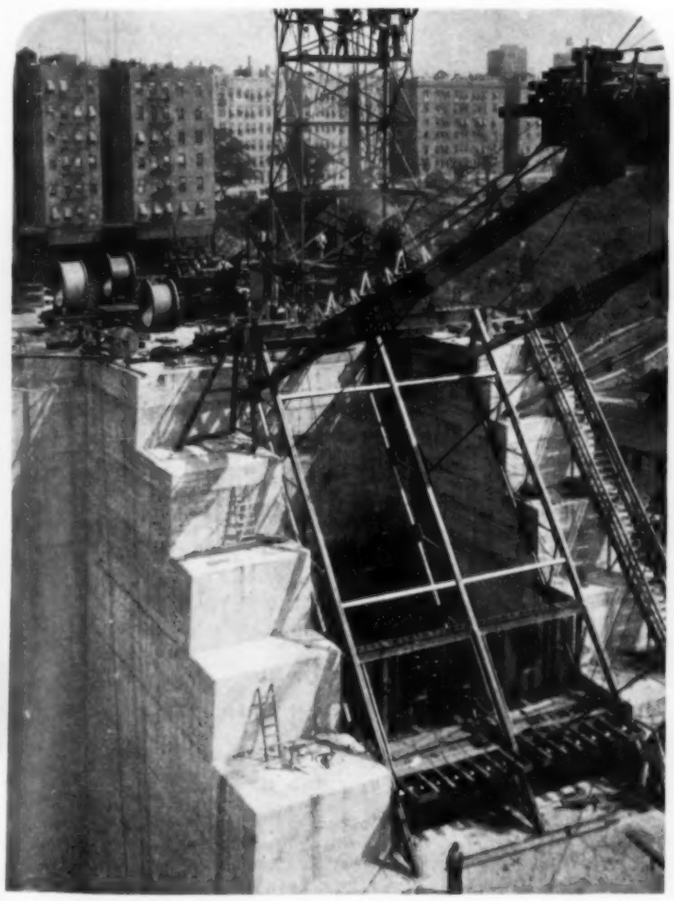
Four reels were mounted at each anchorage for each pair of cables. The reels were special metal drums, wound with 25 miles of wire at the plant at Roebling, N. J. The weight of a reel, as received at the job, was usually about 14,000 lb.

Speed Control—To keep the unreeling rate in synchronism with the spinning speed, a sensitive control was needed which would permit quick acceleration and deceleration of the unreeling machines. The control apparatus had to be equally effective in decreasing and increasing speed. After investigation, the Waterbury Tool Co.'s hydraulic variable speed transmission was found satisfactory for this purpose, and a system of four units was installed to govern the four unreeling machines at each end of a pair of cables.

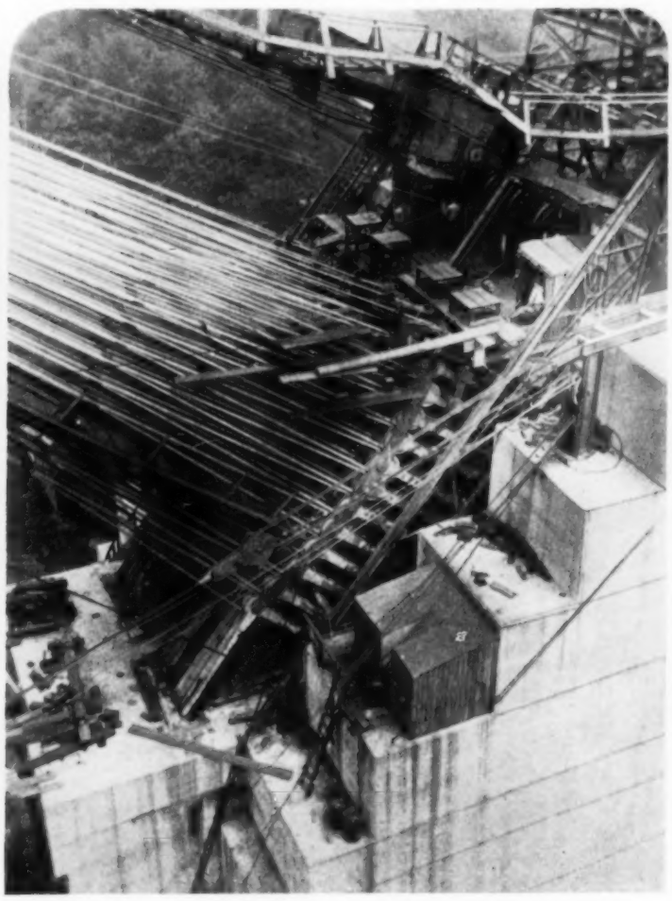


REEL mounted for spinning on hub of power-driven unreeling machine.

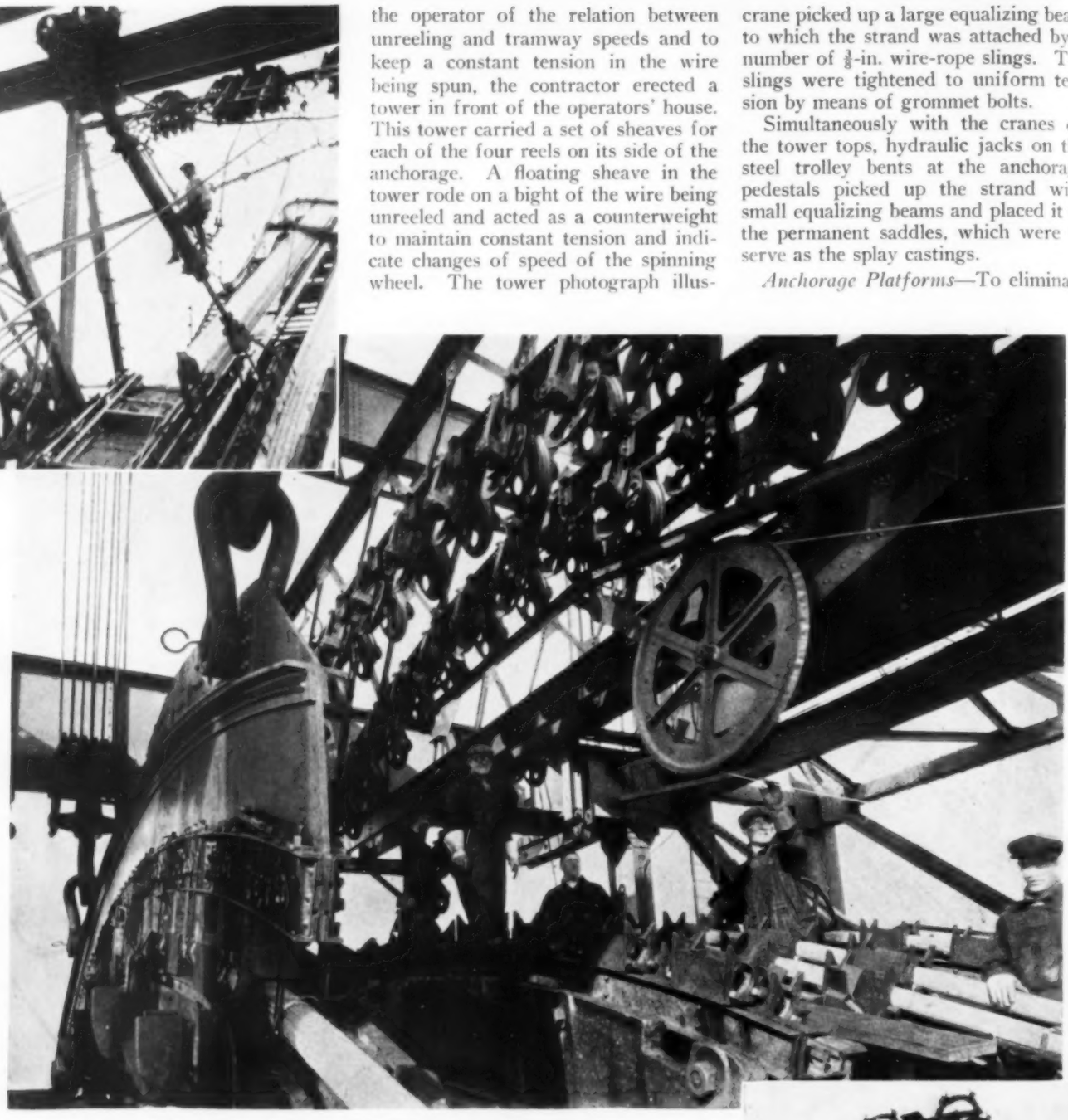
A control system consisted of a 100-hp. electric motor operating four oil pumps, each of which ran a motor unit driving one of the unreeling machines. The speed of the motor unit and of the unreeling machine depended on the



SLOPING STRUCTURAL FRAME carries working platforms. As spinning progresses, platforms move up frame.



WORKING PLATFORMS near top of structural frame at completion of cable spinning.



SPINNING WHEEL PASSES OVER TOWER TOP. Split sheaves permit passage of plate connection by which spinning wheel is hung directly under hauling rope. Large balance beam lifts completed strand out of temporary spinning saddles and places it in permanent saddle. Sheaves to be seen alongside temporary saddles carry live wire of loop being strung. TROLLEY JACK *(above, left)* on steel bent at anchorage pedestal lifts completed strand from temporary spinning saddles and places it in permanent splay casting. FLOATING SHEAVES *(below, right)* in counterweight tower keep constant tension in wire being strung and indicate relation between unreeling rate and stringing speed.

amount of oil delivered to the motor by the pump. A hand wheel in the operators' house controlled the piston stroke of the pump and, thereby, the amount of oil delivered. By turning this wheel, the operator could brake the unreeling machine from maximum speed to full stop in a few seconds. The reverse operation could be performed in equally short time.

Counterweight Tower—To inform the operator of the relation between unreeling and tramway speeds and to keep a constant tension in the wire being spun, the contractor erected a tower in front of the operators' house. This tower carried a set of sheaves for each of the four reels on its side of the anchorage. A floating sheave in the tower rode on a bight of the wire being unreeled and acted as a counterweight to maintain constant tension and indicate changes of speed of the spinning wheel. The tower photograph illustrates this use. By varying the speed of the unreeling machine to keep the floating sheave in constant position the operator synchronized the unreeling rate with the spinning speed.

Handling Strands—A 100-ton gantry crane, running on a girder frame erected on top of the tower, lifted completed strands from temporary spinning position into the tower saddle. As shown by one of the photographs, the crane picked up a large equalizing beam to which the strand was attached by a number of $\frac{3}{8}$-in. wire-rope slings. The slings were tightened to uniform tension by means of grommet bolts.

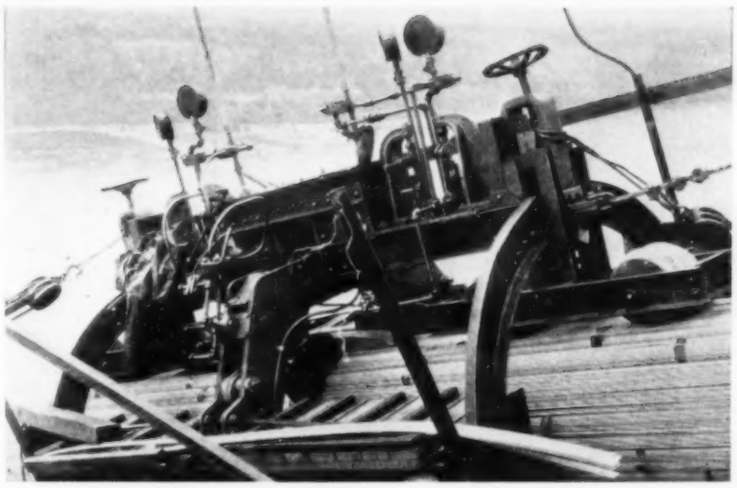
Simultaneously with the cranes on the tower tops, hydraulic jacks on the steel trolley bents at the anchorage pedestals picked up the strand with small equalizing beams and placed it in the permanent saddles, which were to serve as the splay castings.

Anchorage Platforms—To eliminate

delay in erecting working platforms at the anchorages as the spinning of strands progressed, a sloping structural frame was constructed at the end of each pair of cables. This frame supported the working platforms, which were moved upward on the sloping members as the job advanced. Each platform carried two sheaves for strand wires and two sheaves for the tramway rope.

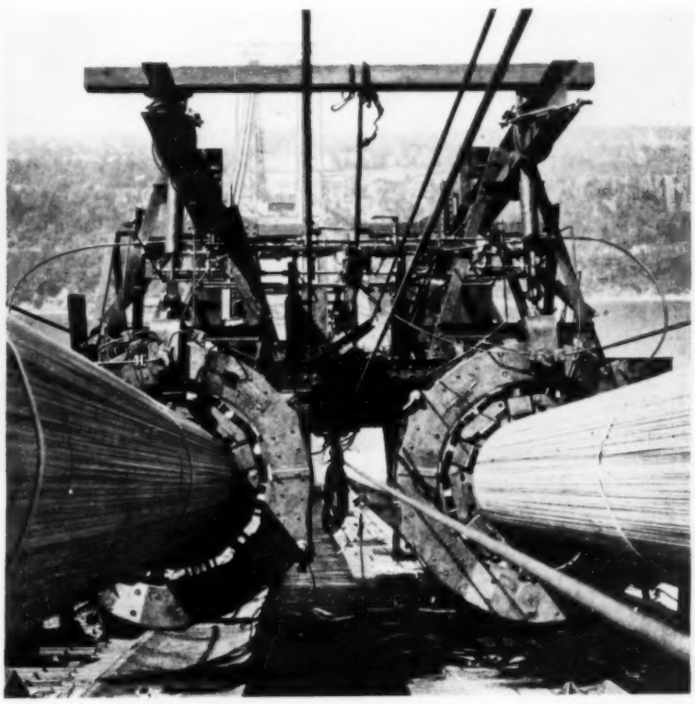
Pressed Wire Splice—An important advance in the art of wire spinning was made by the John A. Roebling's Sons Co. in the development of a pressed splice to replace the usual threaded coupling. Machines identical with those used in making splices in the shop were installed in the field at both ends of each pair of cables.

The ends of the two wires to be spliced were pressed in a machine which produced grooves on two sides of each wire, deforming the wire to produce a slightly elliptical, corrugated section. The ferrule, or coupling, was roughened on the inside. To make the splice, the ferrule was laid on one of three segmental jaws of a hydraulic press, the wires were inserted at either end, and a total pressure of about 200,000 lb. was applied for one minute. This type of splice was practically 100 per cent efficient.



PRELIMINARY COMPACTOR, mounted on carriage, squeezes cable to diameter of about 38 in.

HYDRAULIC SPLICING MACHINE *(left)* presses ferrule, roughened on inside, on to deformed ends of two wires to be spliced



PAIR OF FINAL CABLE COMPACTORS *(right)*, on one carriage, reduce diameter of two cables to 36 in.

Compacting Cables—To compact the 61 completed strands, each 4½ in. in diameter, into the 36-in. cable, the contractor used two sizes of hydraulic squeezing machines. Both are shown in photographs. The light, preliminary compactor, equipped with six segmental jaws, compressed the strands into a roughly circular cable of about 38-in. diameter; and the second, heavier machine, with twelve segmental jaws, reduced the diameter to 36 in. After initial dead load has been placed on the cables, they will be wrapped with soft, annealed, double-galvanized steel wire, 0.148 in. in diameter, applied under tension by machine.

Administration—The Hudson River bridge between New York City and Fort Lee, N. J., is being built by the Port of New York Authority, O. H. Amman, chief engineer, Montgomery B. Case, engineer in charge of construction, and Homer R. Seely, resident engineer in charge of cable spinning. For the John A. Roebling's Sons Co., C. C. Sunderland, chief engineer, W. E. Joyce, resident engineer, and W. R. Coppage, superintendent, directed cable construction.

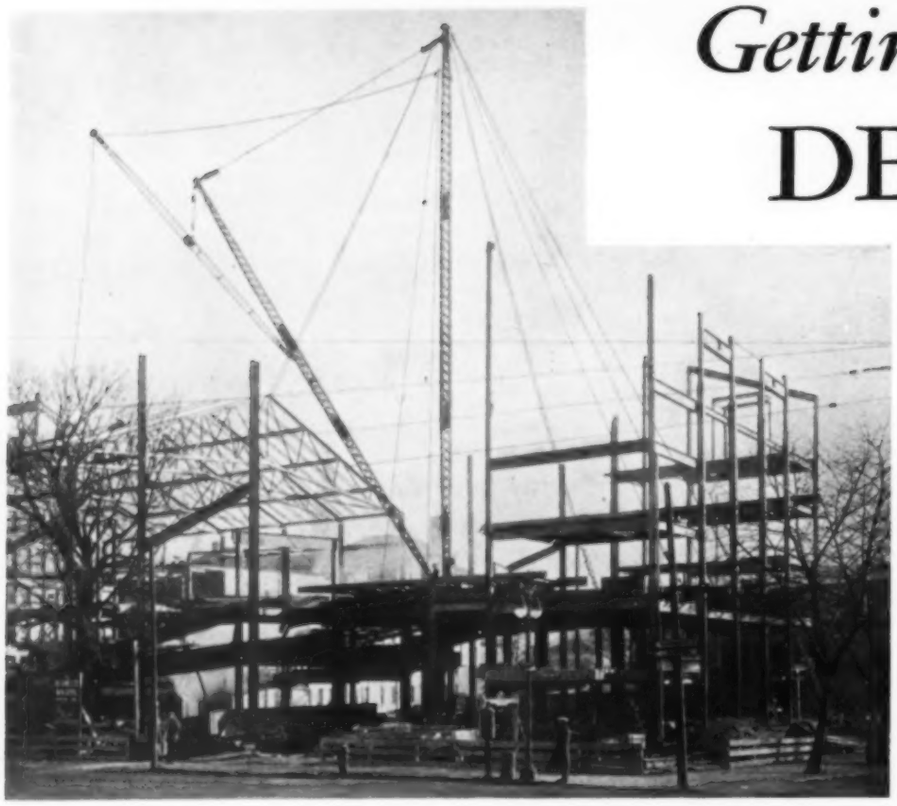
COMING

In Next Month's Issue

The story of remarkable concreting progress and use of cellular cofferdams on the Osage River hydroelectric development, which the Stone & Webster Engineering Corp. is completing for the Union Electric Light & Power Co.

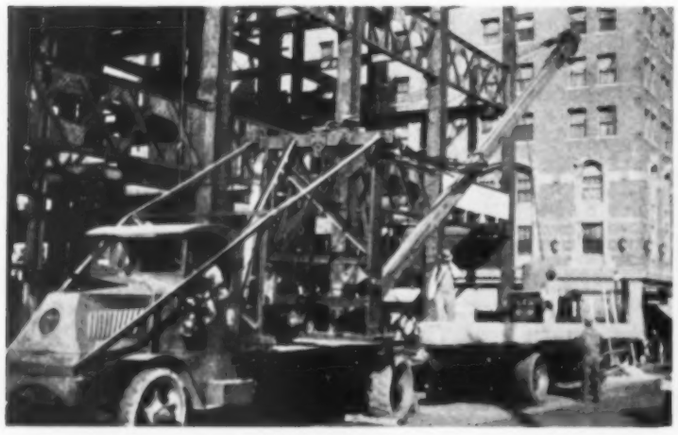
Getting Down to DETAILS

Close-up Shots of Job Methods and Equipment

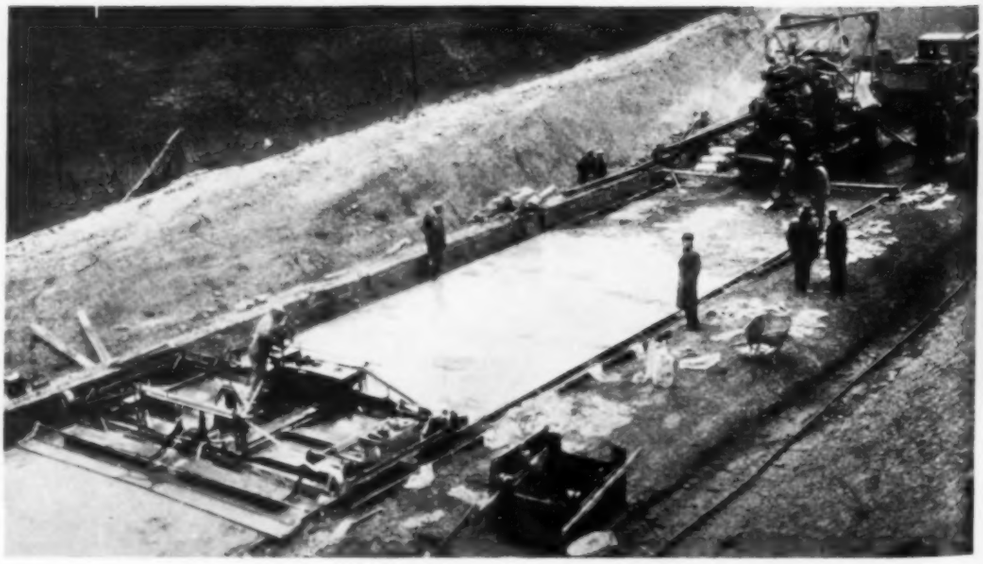


JIB BOOM *(left)* on main boom of guy derrick, used with four-drum hoist, increases operating radius and saves derrick set-ups for Gunvald Aus Co., New York City, steel erector on Horace Bushnell Memorial Hall, Hartford, Conn. R. F. Jones Co., Hartford, contractor.

ADJUSTABLE 400-LB. WHEELS *(below)* add weight to double-blade, crowned road drag in Delaware and also facilitate turning when levers raise front blade at end of trip. Four trips, after rains, produce smooth earth or gravel surface. Truck hauls the grader.



A-FRAME DERRICK MOUNTED ON TRUCK *(above)*, loads heavy timbers at Kansas City Power & Light Co.'s office building. Grant Renne & Co., Kansas City, operate derrick with two-drum hoist driven by power take-off from Mack truck. In addition to 28-ft., 10-ton wood boom used for this work, derrick has 40-ft. wood boom and 60-ft. steel boom.



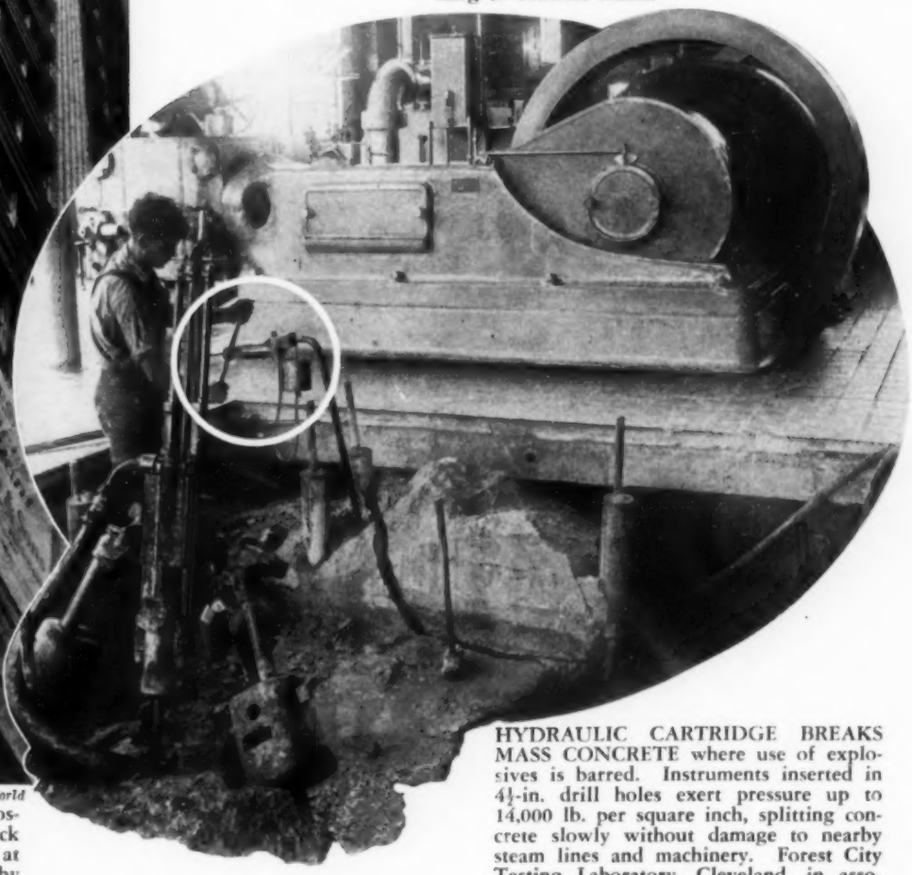
JOINTS FOR CONCRETE BASE *(right)* of 18-ft. brick pavement in Ohio prevent loosening of brick due to loss of sand cushion through cracks in 6-in. base. Flexplane machine *(at left)* installs longitudinal center-line joint and transverse joints every 40 ft. Joint filler is thin waterproof paper, inserted mechanically. Contractors, Brewer & Brewer, Chillicothe, Ohio.

TO PROTECT SUBSTRUCTURE of pier in San Francisco harbor, precast jackets of reinforced concrete are placed over creosoted wood piles by floating stiff-leg derrick.

WORKING IN CLOSE QUARTERS on busy street, Bay City cranemobile removes spoil in side-dump buckets for subway duct setback during widening of Lexington Ave. Crane has no revolving overhang to obstruct traffic.

©Wide World

ALL GLASS CORNER WINDOWS, made possible by cantilevered floor beams and setback columns, are new features of office building at 21 West St., New York, constructed by Rheinstein Construction Co. Architects, Starrett & Van Vleck.



HYDRAULIC CARTRIDGE BREAKS MASS CONCRETE where use of explosives is barred. Instruments inserted in 4½-in. drill holes exert pressure up to 14,000 lb. per square inch, splitting concrete slowly without damage to nearby steam lines and machinery. Forest City Testing Laboratory, Cleveland, in association with Hydraulic Concrete Breaking Co., controls the process.

The Superintendent Discusses

BATCH HAULAGE

BILL, the superintendent, was at the material yard checking up on the trucks when the "general" dropped in. Things hadn't been going to suit him for the last few days.

"To tell the truth," he explained, "when we started on this end we got some pretty nice runs. Fact is we laid the first mile in just a bit over four days. I didn't pay much attention to it when the fourth day's run was less than first day's run. Thought perhaps the crew didn't quite get the proper stride. But Monday's run was a little less than Saturday's and yesterday's run was still worse—not bad you understand—but not what it ought to have been. We started with a 5-mile haul. Now we're down to a little over 3½ miles. The road seems to be in good condition—all but a few bad spots at least—but the material isn't coming through fast enough."

"Not altogether surprising," was Jim's quick comment. Jim had had a lot of experience in road construction and as general superintendent he found good use for all of it.

"It rained a little Saturday evening, didn't it?"

"A little," Bill agreed. "Not enough to wet things much. The road was dry enough to haul over Sunday afternoon."

"Did you blade it Sunday?"

"No, the road wasn't rutted. A little mussed up in spots, but not rough."

"Let's see"—Jim's comment was addressed quite as much to himself as it was to Bill. "We have those new two batch trucks down here. They're fast trucks. Bill, how many trucks did you start on this end?"

"Eleven."

"How many trips did they make the first day?"

"They hauled 506 batches — eleven hours, you know. One truck made 25 trips."

"That would be an average of about 23 trips."

"Yes."

"And how many batches did they haul yesterday?"

"Four hundred and sixty-one."

"That would be about 21 trips per truck."

"Yes."

"Now, Bill, let's do a list of figuring. The first day you were on this end the trucks made 23 trips. That's a trip every 28¾ min., or practically that. It takes from 4 to 6 min. to put on a load and from 2 to 5 min. to drop it at the mixer. Eight minutes is a pretty fair working average. That leaves a bit over 20 min. for running 10 miles—half of it under load. Those trucks must have been averaging about 30 miles an hour. That's pretty fast running, but they are good for it if they have a smooth road to run over. But it has to be smooth. All of it has to be smooth!

"You know, Bill, hauling on a fast schedule is a bit like driving on a fast schedule. You set out for Jonesville—it's only 160 miles—but if you want to make it in four hours you have to drive 50 most of the time. You cut down the speed for every turn and at a lot of cross-roads, to say nothing about the towns, and before you know it you're averaging under 40.

"Now it's just the same on a paving job. The first day the road is smooth—just about perfect—no bad spots anywhere and the trucks go through at top speed all the way. The next day a rough spot develops. Its only a spot. Probably it isn't more than 20 ft. long. But, to be safe, every truck driver slows down

E BY MOTOR TRUCK

Jim Gives Bill a Few Practical Pointers

when he comes to it, just as you do when you come to a bad spot or a sharp curve on the highway. The next day there are two or three bad spots and the next half a dozen as well as a stretch of road that really isn't bad—just a little slow. The result is about what you have here.

"Yesterday the trucks hauled 461 batches. That sounds very much like an average speed of only 25 miles an hour! The road isn't bad. On the whole it looks pretty good. Here and there a bad spot. Nothing more. But—and here's the point—those bad spots 'here and there' have knocked five miles an hour off of the average speed those trucks can make by just making them slow down every half mile or so!

"These trucks cost us $25 a day. If they were still making thirty miles an hour, nine of them would keep the mixer going today! That means we would be getting a little more yardage and saving $50 a day on the hauling if the road was in such condition that we could hold the truck speed up where it belongs."

"Seems reasonable," was Bill's comment. "But, Jim, what did you have in mind when you asked if the road was bladed last Sunday?"

"That 30 miles an hour, Bill, that 30 miles an hour! Speed is a great money saver if your trucks are built for speed. That doesn't mean that there is money in driving a truck built to run 15 miles an hour under load at 25. It ought never to be done. But with trucks which are built for speed—and ours are—there is money in speed.

"But if you expect to get high speed, *all* of the road must be good *all* of the time. That means maintenance and a good deal of it. The state highway departments know more about road maintenance than any of us knows. That's why the roads they maintain always are in such fine condition, even the earth roads. The other day I asked one of the state engineers how they kept their roads—the earth roads which, after all, are about like the roads we use— in such fine condition.

"We keep them flat," he replied, "so the traffic won't run in one place, and we blade them often enough to keep ruts and rough spots from forming."

"Now, of course, Bill, there are times when the weather is so dry blading doesn't do much, if any, good, but when the weather is normal it pays to blade right often—often enough to keep *all* of the road smooth. A lot of people put this work off till the road surface is full of ruts and holes. Then, when blading it proves a failure they complain that the expense is high and the results pretty poor. And, what is more, they are right about it. But work done that way overlooks the fact that blading is a method of prevention, not a cure. It is not done to fix bad roads but to prevent their becoming bad roads! There is quite a difference!"

"Then you think, Jim, that if the blade had been started last week it would perhaps have been possible to keep the trucks at top speed all this time?"

"Probably."

"Is it too late to start now?"

Jim thought a moment before replying. "I hardly think so," was his somewhat cautious rejoinder. "On the contrary, if the blade isn't started at once, conditions are likely to grow worse."

"Just what do you mean by that, Jim?"

"Well, Bill, I've seen roads much like this one get so bad that the trucks didn't average 10 miles an hour! No fault of the trucks either. Usually just a matter of the road getting poor maintenance or no maintenance at all. If that should happen here, we should have to lay another mile of pavement before we could lay off any of the trucks—and we are using too many now. Bill, we can't afford that. Profits are too narrow."

"Yes," was Bill's comment, "that's clear enough. I'll have the boys get out the blade and start it this afternoon. It'll cost something to run it, but if it keeps the road from getting rougher, it will save us some money."

"That's just it," Jim cut in. "And don't ever forget it. The blade may look like an expense. It is an expense. But if it is keeping the road smooth it is saving a lot of money. When a road becomes rough, truck speed—often a lot of it—can be lost in no time and that costs real money! It's always wiser to keep the road smooth.

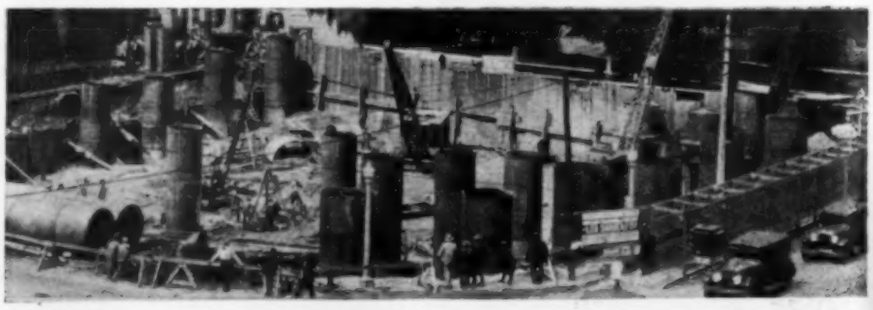
"But, Bill, I'm hungry. Let's hunt up some lunch. We can look over our troubles again some other day. There always are enough of them to worry about—and more in contracting than in other places, it seems to me!"

LOAD OF MUCK, excavated from inside steel cylinder, is placed in receptacles on top of caisson. *(A)* Caissons have been sunk to grade under weight of material dumped into cylindrical containers on structural steel cross-frames. *(B)* Crane places cross-frame on top of steel caisson.

FOUNDATION CAISSONS

Loaded With Excavated Muck

IN sinking 61 steel-cylinder caissons, 30 ft. deep and 6 to 8 ft. in diameter, for the foundation of the Montgomery-Ward Building, Oklahoma City, Okla., Leo C. Sanders, contractor, of the same city, devised an efficient method to speed the descent of the steel cylinders. After driving the shells part way into the earth with McKiernan - Terry hammers, Mr. Sanders erected a structural steel cross-frame on top of each cylinder and placed two cylindrical steel receptacles on the frame, one on each side of the opening over the caisson, through which an orange-peel bucket could operate.



STEEL CYLINDER CAISSONS are seated in bottom of basement excavation, ready for erection of structural cross-frames.

BRICK WALLS are fodder to this shovel. Skillful operator separates brick and loads them into truck with little breakage.

Cranes excavated inside the caissons and loaded the muck into the receptacles on the steel frames. In this way, the caissons were sunk to the sandstone foundation.

Before starting caisson operations, the contractor cleared the site of old buildings and carried the general excavation to 17 ft. below street level. A power shovel proved very effective in wrecking old brick walls. The operator learned to take off the brick in such a way that they were well separated when the bucket dropped them into the truck. Not much breakage resulted from this method, and practically all the brick were salvaged for use elsewhere.

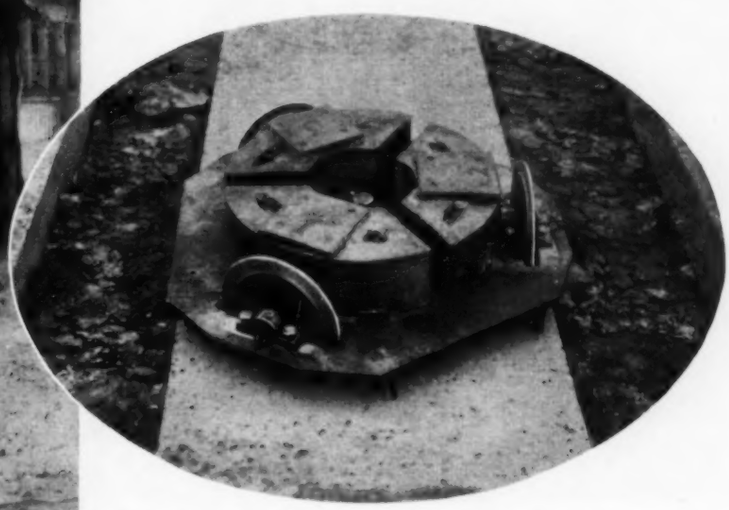
JOB ODDITIES

A Monthly Page of Unusual Features of Construction

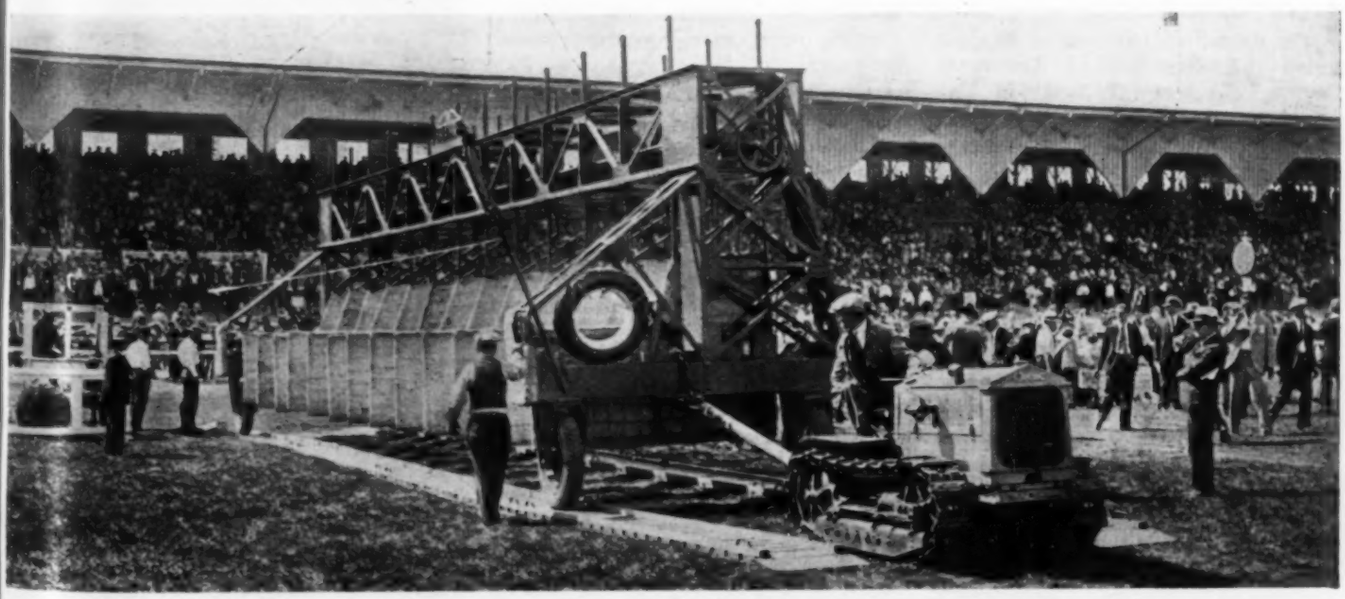
TO TEST SOLUBILITY and permeability of rock at Madden damsite, Panama, 2-in. cores removed by diamond drill are mounted in lines of pipe and subjected to hydrostatic pressure, measured by gage.

©Ewing Galloway

FOR SCREENING SAND used in making mortar, primitive methods and equipment are still employed in India. Inclined fibre mat, fed with material from basket, makes rough separation of coarse and fine sizes.



SURFACE HARDNESS of concrete pavements is measured by this device of the U. S. Bureau of Public Roads. Vertical spindle revolves 450-lb. frame carrying three 8-in. steel disks ¼ in. wide. Depth of wear measured after 1,000 revolutions.



TRACTOR IN NEW ROLE. Cletrac, usually associated with road grading operations, levee building and dam construction, moves new type of starting stalls into place for Gallant Fox and other thoroughbreds at Pimlico race track, near Baltimore, Md.

STEEL FLOOR SYSTEM of Wabash Ave. bridge, Chicago, to which was anchored, by welding, steel flange plates of precast, light-weight concrete slabs.

PRECAST SLABS, with a surface area of 102 sq.ft. for the main roadway and a thickness of 5¼ in., were lowered to place and welded to the structural steel frame.

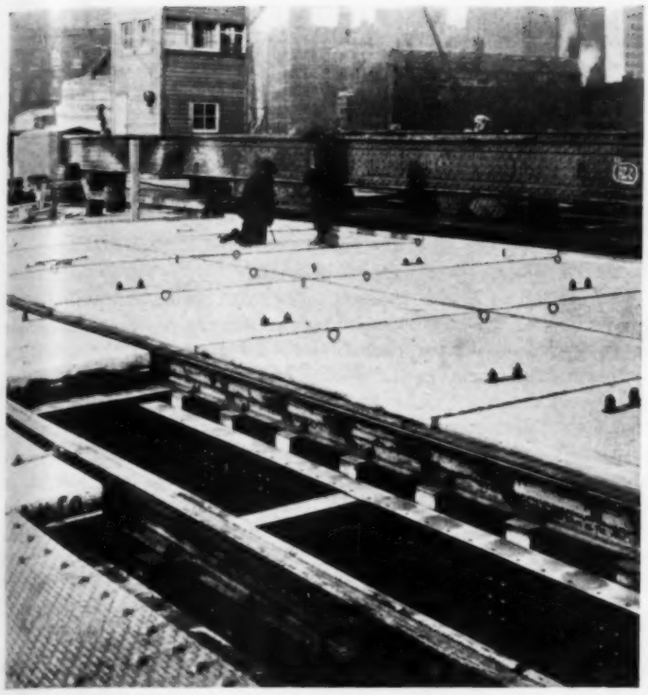
Bridge Floor Paved
LIGHTWEIGHT

IN BUILDING the much needed Wabash Ave. bridge in Chicago, the municipal Division of Bridges, under the direction of Loran D. Gayton, city engineer, Major Paul Schioler, city bridge engineer and Donald N. Becker, engineer of bridge design developed a new type of bascule bridge floor construction using precast slabs of light-weight concrete equipped with steel flange plates which are attached by welding to the steel floor system of the bridge.

Precast slabs of light-weight concrete were first used by the City of Chicago on the 106th St. Bridge, completed in 1929. In the new Wabash Ave. bridge a further improvement has been made by a process of vibration during the casting of the concrete.

In the design of bascule bridges dead weight is a prime consideration. The weight of each span must be balanced by a concrete counterweight. Any dead weight in excess of the minimum, therefore, is a severe handicap since, in addition to the required mass of the counterweight, additional capacity of operating machinery must be provided.

Formerly the practice in Chicago has been to use a structural floor of timber, paved with wood blocks. This required the use of a waterproofing treatment between the structural floor and the paving. Through the development of the high strength, light-weight concrete, a permanent floor construction, requiring a minimum amount of maintenance, has been made possible without the handicap of added weight which other permanent forms of construction would impose. The use of this light-weight concrete, in the form of precast slabs, has made the installation of the floor construction one of extreme simplicity, at the same time permitting the unrestricted opening of the spans during construction. On the Wabash Ave. bridge the typical roadway slab has an area of 102 sq.ft. and the sidewalk slab an area of 98 sq.ft.



FOR HANDLING SLABS U-bolts passed through four holes, fitted with pipe sleeves, to engage hooks from stiff-leg derrick cables and, later, anchor the slabs to the bridge floor.

IN RAISED POSITION. Bascule span is paved with precast, light-weight concrete slabs securely held in place by U-bolts and welding of flanges to bridge steel.

With Precast Slabs of CONCRETE

Slabs of smaller area were used between car tracks and to fill out the area of the roadway.

The roadway slabs have a total thickness of 5¾ in., the lower 4 in. of which is of concrete employing what is known commercially as Haydite—an inert graded product made of burnt clay or shale—for the coarse aggregate. The proportions used were 1 part cement, 1½ parts fine torpedo sand and 2½ parts of Haydite, with a water content of 4⅞ gal. per sack of cement. The upper 1¾ in., which was cast integrally with the base, had granite chips for coarse and granite screenings for fine aggregate in the proportion of 1 part cement, 1 part fine aggregate and 2 parts coarse, with a water content of 4¼ gal., per sack of cement. A high-early-strength cement was used.

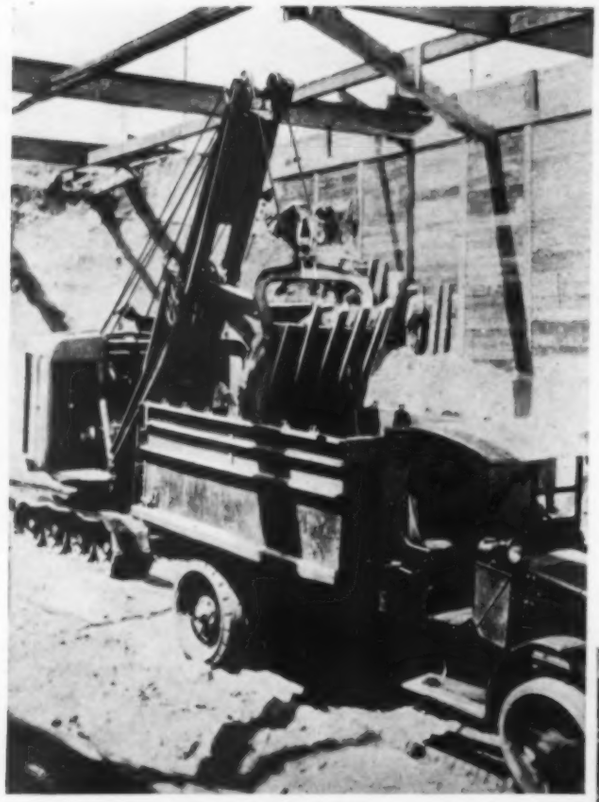
Of the total thickness of 5¾ in. 5½ in. is depended upon for structural resistance, the remaining ¼ in. being an allowance for wear. The wearing surface has an average weight of 160 lb. per cubic foot and the base 117 lb. per cubic foot. An average strength of 7,000 lb. per square inch was obtained at the age of 90 days for the granite aggregate concrete.

Handling and setting of the slabs for both the 106th St. and the Wabash Ave. bridges was facilitated by the use of four holes fitted with pipe sleeves in each slab through which U-bolts were passed to engage the hooks of stiff-leg derrick cables during placing and serve as an anchor to the steel deck framing while the slabs were being permanently attached. Three-eighth inch steel plates protruding from the slabs at regular intervals provided a means of welding directly to the steel stringers of the deck framing after which U-bolts were removed and the holes filled up with grout. The work was finally completed by the insertion of the standard type of joint filler between the edges of abutting slabs.

Building New York's Subway's—VII

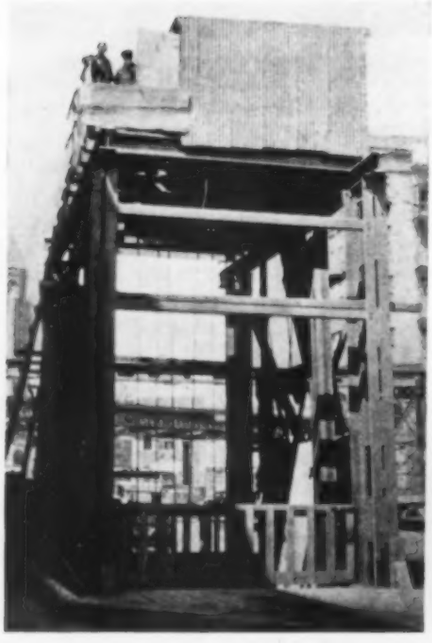
WHEREVER the size and character of the cut will permit its use, New York subway contractors prefer to employ a power shovel for excavation. To dispose of the spoil, the only practical vehicle is the motor truck. The most economical way to load the truck is by spotting it beside the shovel, and only force of circumstances causes any other method to be used. Ramps, where they can be constructed and maintained without excessive cost or interference with traffic, offer the simplest means of entering and leaving the cut. If lack of space or other condition prevents unhampered use of ramps, the subway builders install electric elevators in structural steel shaftways.

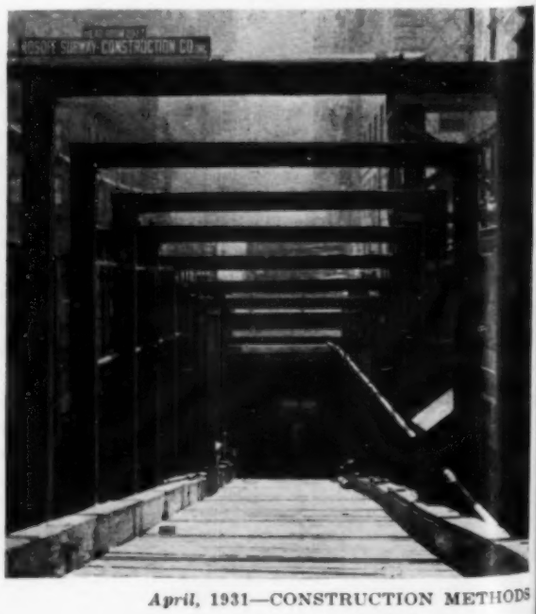
Ramps are constructed with either steel or wood bents and either



POWER SHOVEL AND TRUCK are combination of earth-moving units used wherever practical on subway construction. Shovels are usually ¾ yd. to 1 yd. in capacity; trucks, almost invariably, haul 7 to 8 yd. per trip.

IN NARROW ROCK CUTS, for depressed tracks, tunnel muckers are much used, because of small size. This shovel of Rosoff Subway Construction Co., Inc., is loading skips to be raised to street by stiff-leg derrick.





HEADFRAME of elevator shaft, Del Balso Construction Corporation. Penthouse contains hoist and 100-hp. electric motor. Elevators and ramps are most common means of getting trucks into and out of cuts. **RAMP** *(at extreme right)* enters cut from street surface. Where possible, contractors usually prefer to put ramp entrance in private property, outside street. **TEMPORARY RAMP** *(in center)* serves Carleton Co., Inc., until elevator, in background, can be put in operation. Two 260-lb. 36-in. I-beams 75 ft. long are paved with planks to which ⅞-in. wire rope is nailed to prevent slipping.

Power-Driven Equipment Excavates and Removes Subway Spoil

concrete or wood flooring. On congested streets, the contractors attempt to locate the ramp entrances outside the thoroughfares, in private property or in cross streets.

In cuts made by power shovels, the sloping banks left along both sides are cleaned up by small shovels, skimmer scoops or cranes. A few contractors have had some success in using belt conveyors, loaded by hand, for this operation.

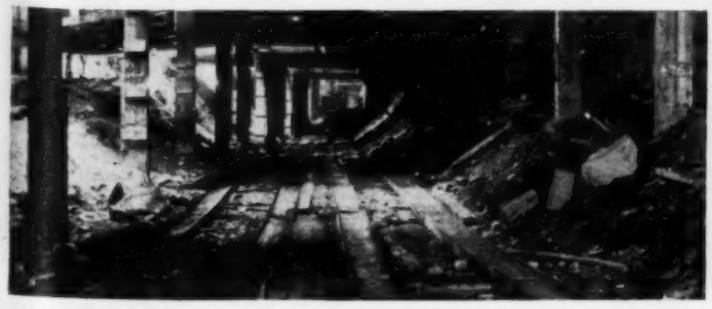
The belt conveyor is the principal piece of auxiliary equipment employed in disposing of spoil. In places where crowded working conditions prevent loading by power excavators, the conveyor performs a valuable service in moving spoil shoveled by hand.

On certain subway sections, contractors have installed other types of machines for hoisting and dumping spoil. The limited extent to which these kinds of equipment have been applied can be ascribed to a general preference for simpler methods. Direct loading is the most economical procedure.

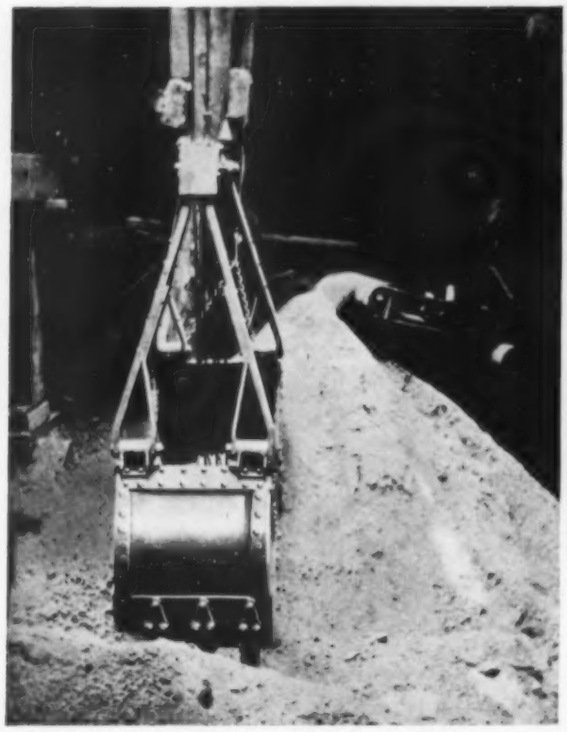
SMALL CRANE excavates 4 ft. beyond neat line at cross street to provide set-back for three lifts of vertical sheeting. For secondary excavating work, contractors use many light machines.

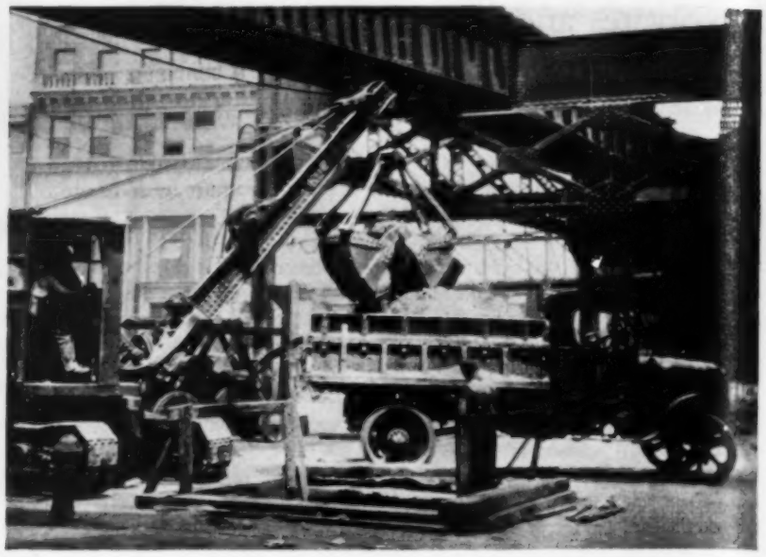
FIRST CUT in street is made by hand labor and crane. Oakdale Contracting Co. saves time of swinging boom to load by laying I-beam runway for trucks as crane backs up, taking first cut of 8 or 9 ft. I-BEAM TRACKS *(below)* for trucks are used on several sections to facilitate hauling in soft ground. Corson Construction Corporation, contractor.

TO CLEAN UP BERM left by large shovel along sides of cut, Carleton Co. uses ¼-yd. gasoline tractor-powered shovel. Small shovels are commonly employed for this final clean-up.



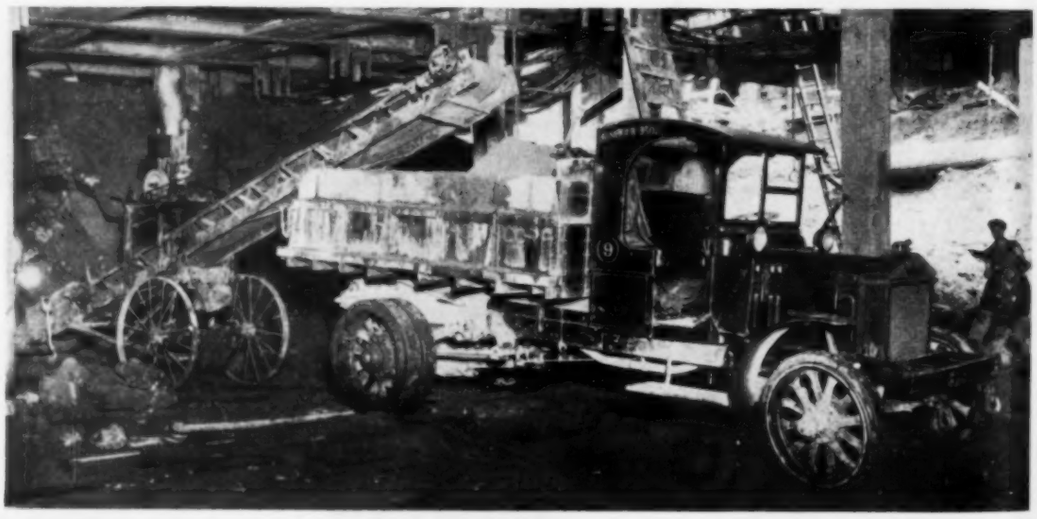
Building New York's Subways—Part VII (continued)

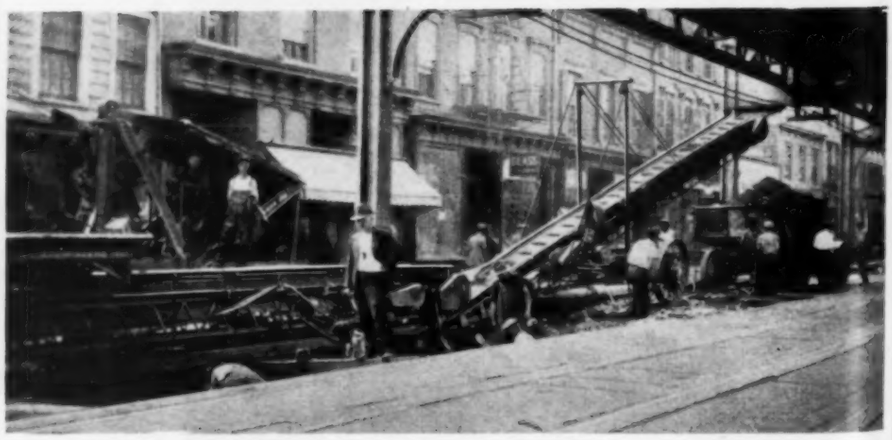




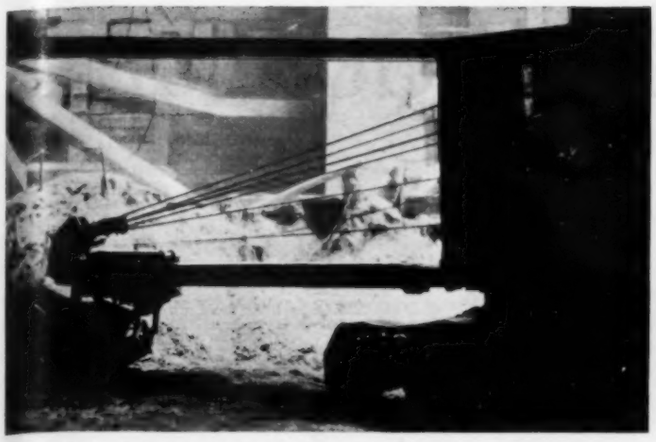
WHERE CONGESTION OF UNDERPINNING PILES makes it impossible to operate power shovels, Triest Contracting Corporation excavates by hand and uses belt conveyors *(left)* to deposit spoil under hatches in deck. SHORT-BOOM CRANE *(above)* operates on deck under elevated railway structure and loads spoil from below into trucks.

FOR TRIMMING BERM *(right)* along sides of cut, Triest Contracting Corporation in some places uses hand labor and belt conveyor to load truck

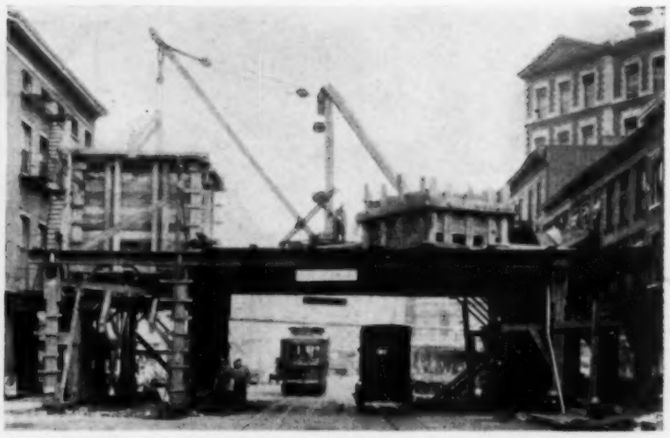




ON CONGESTED STREET carrying car tracks and elevated railway structure, Goldberger-Raabin Co., Inc., uses conveyor loading system in opening first cut, 4½ to 5 ft. deep. Horizontal 75-ft. conveyor discharges on 39-ft. portable belt loader which fills trucks. Small crane, on sidewalk, feeds movable hopper on 75-ft. conveyor. Arrangement is flexible and fast, reducing loading time made by small excavator.

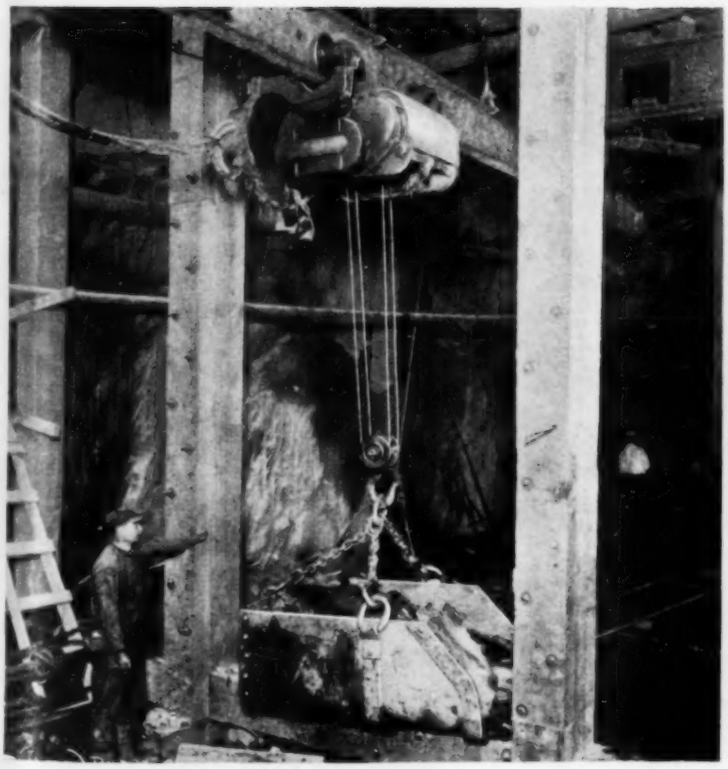


SKIMMER SCOOP is another machine used by Triest Contracting Corporation to clean up berm along sides of cut.



DERRICK ON BRIDGE across decked street lifts buckets of muck from cut below deck and dumps them in elevated hopper which discharges into trucks, on subway section of Oakdale Contracting Co., Inc.

HUGE MOVABLE STEEL GANTRIES, each carrying two electric 5-ton trolley cranes, handle muck skips out of cut to trucks. As described in *Construction Methods*, June, 1926, p. 6, Frederick L. Cranford-Charles H. Locher, Inc., devised these machines to reduce congestion and increase flexibility of excavating operation on heavy-traffic business street. Structures have 140-ft. span between supports and 25-ft. cantilever at each end, where trucks are loaded.



ELECTRIC TROLLEY HOIST *(left)* moves 1½-yd. skips in cut for Frederick L. Cranford-Charles H. Locher, Inc. TROLLEY CRANE *(above)* lifts skips and loads spoil into trucks. Arthur A. Johnson Co., contractor.

NEW EQUIPMENT

WEIGHTOGRAPH is attachable to any built-in type of beam scale from 1,000 lb. upward, or to any scale convertible to beam operation. It is designed to provide automatic weight indication by optical magnification, thus overcoming disadvantages of slow hand-weighing methods of beam scale and mechanical complications of dial scale. Precision chart or negative magnifies movement of weigh beam, reflecting exact weight on ground glass reading screen and giving correct indication to observer in any position. Electrically illuminated figures can be read in the dark.—Howe Scale Co., Rutland, Vt.

7-YD. SCRAPER *(below)* designed for use with 60 to 75-hp. tractors carries two-thirds of load in bowl. Other one-third drags on ground so that most of the weight is on wheels. Bucket, rigid in frame, is raised or lowered by cantilever action of rear wheels. To load, hoist cable is released to give required depth of blade. When loaded, blade is raised until level with ground. For dumping, blade is raised to desired depth of spread, unloading cable pulls gate forward and material is expelled and spread to depth of blade setting. Goose-neck construction gives short turning radius. Wheel base, 20 ft. Length of blade, 10 ft.—R. G. LeTourneau, Inc., Stockton, Calif.

SPIRAL WELDED PIPE *(below)* is made in jointless lengths up to 40 ft., in sizes from 6 to 24 in. in diameter and in any wall thickness from 12 gage to $\frac{1}{4}$ or $\frac{5}{8}$ in. Advantages claimed are: Lighter weight, easier handling, long sections which reduce number of field joints and smooth inside wall which lessens friction and pumping costs. Spiral joints serve as stiffeners to walls of pipe. Spiral weld compensates for shrinkage and produces a straight, true round pipe.—American Rolling Mill Co., Middletown, Ohio.

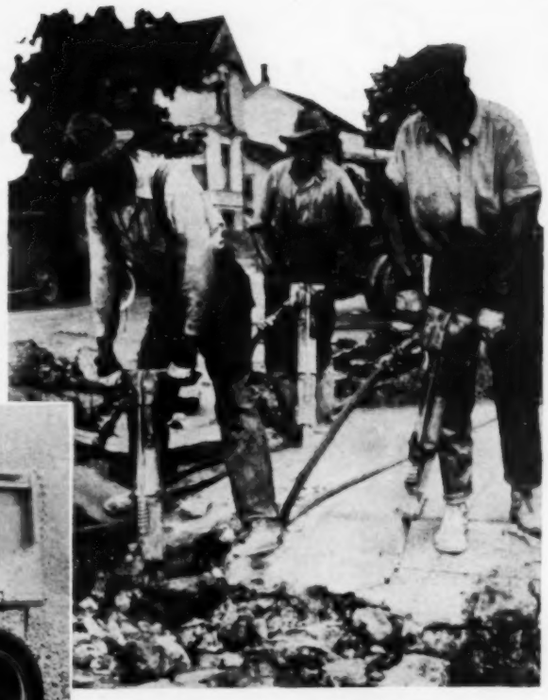
DIESEL DRAGLINE of 3-yd. capacity, on crawler mounting, works in soft ground. Machine has: Complete air control and short, easily manipulated hand levers which permit operator to work steadily without fatigue; power-driven boom hoist; non-collapsible bucket; box-type lattice boom; large area cone swing clutches and silent engine transmission. Powered by 6-cylinder, full-diesel engine.—Bucyrus-Erie Co., South Milwaukee, Wis.

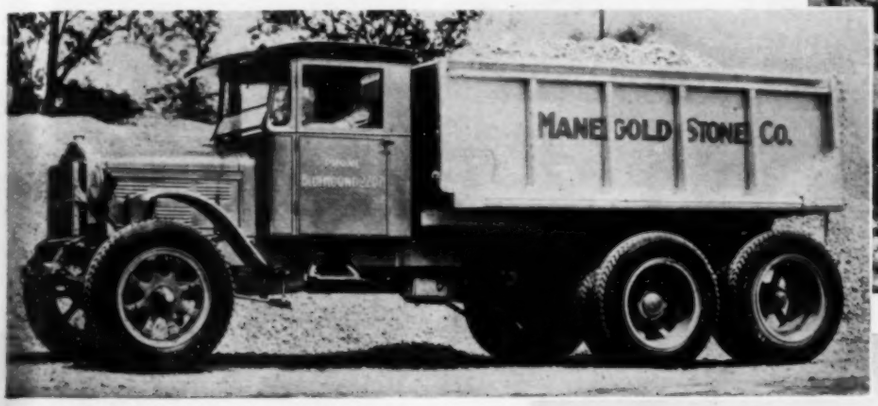
BUCKET LOADER *(right)* handles sand, stone, coke, coal and other materials at low cost. Has improved helical ribbon-type feeder with cast steel spiral which digs, lifts and conveys material to buckets, cutting 7-ft. 7 in. swath. Powered by Buda 30-hp. engine or 20-hp. electric motor. Rated capacity of elevator is $1\frac{1}{4}$ cu.yd. per minute.—Link-Belt Co., 910 S. Michigan Ave., Chicago, Ill.

on the Job

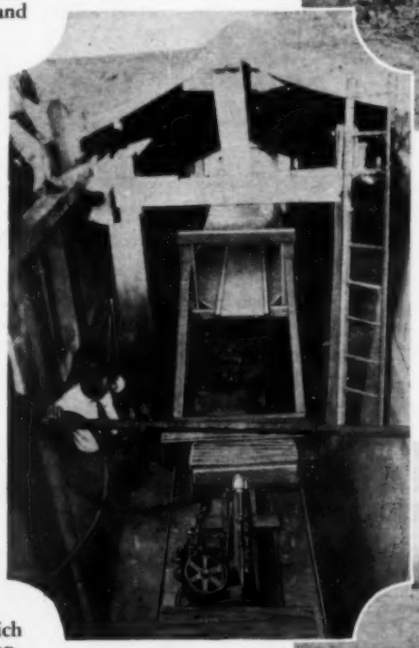
ALUMINUM ALLOY BODY *(below)* on truck replaces steel for sheet and structural shapes, saves 2,080 lb. in weight and enables operator to carry an extra ton of material to each load, or 12 more tons a day without increasing operating costs or exceeding state highway load limit. Savings in maintenance also are possible as aluminum does not rust or scale and fewer repaintings are necessary. —Aluminum Co. of America, Pittsburgh, Pa.

HEAVY-DUTY PAVING BUSTER *(right)* for use in breaking hardest steel reinforced concrete has new features. This compressed air tool is novel in design of front head and of steel retainer. Retainer, of cam type without springs or trunnion, enables steel to be locked easily by hand or foot pressure and held rigidly in position and to be released quickly when desired. Weighs 80 lb.—Sullivan Machinery Co., 400 N. Michigan Ave., Chicago, Ill.





SHOULDER FINISHER *(right)* shapes road shoulder and berm accurately once the proper amount of earth is placed. Consists of platform mounted on pneumatic tires and carrying an A-frame and column supporting a set of blades which conform to the required specifications. Made in three sizes of blades: 8 ft., 10 ft., and 12 ft. 6 in. Will finish shoulders from 5 to 11 ft. Guide bar in rear runs along edge of finished slab and holds machine in exact line, automatically fixing relation of edges of slab and berm. — Insley Division, National Equipment Corporation, 30th St. & Concordia Ave., Milwaukee, Wis.



ELEVATING GRADER *(below)* built to withstand strain of heavy crawler-tractor operation. Frame has backbone of 10-in. steel tubing and three-point suspension on the axles, with a 5-in. chrome-nickel heat-treated ball acting as the fifth wheel at the front end. Front axle is a built-up girder of heavy steel beams between which are stubs of steel bolted to channels. Tongue is an H-beam braced by a rolled plate to ends of axle. Belt carrier independently operated by a 35-hp. engine. Floating belt troubles are eliminated by tying the back and front posts that support the head drum to a 10-in. steel tube. Loads 300 cu.yd. per hour.—Western Wheeled Scraper Co., Aurora, Ill.

AIR-MOTOR-DRIVEN HOIST, for pushing culvert or other pipe through earth, is a single unit composed of a specially built jack, a series of gears, and a 3½-hp. heavy-duty Ingersoll - Rand reversible air motor which furnishes power for operation. Automatic shutoffs at both upper and lower limits of ram assure positive safety. One man controls one, two or a series of hoists from a Y-valve, or operates one singly at the motor. Hoists of 50 or 100 tons capacity extend to their full length under maximum load in 3 min. and under lighter loads in as short a time as 1 min. Built in any capacity up to 100 tons.—Joyce-Cridland Co., Dayton, Ohio.

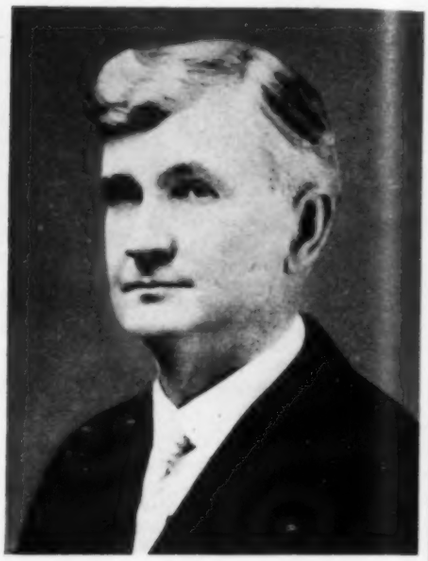
Present and Accounted For —

A Page of Personalities

H. P. CHAPMAN, formerly construction engineer, has been appointed assistant director and chief engineer of the Ohio State Highway Department. Before entering the highway department ten years ago, Mr. Chapman served with the American Zinc Co. and Pennsylvania Ry.

C. AUBREY NICKLAS is the newly elected president of the General Contractors' Association of New York. He is the chief executive officer of the Empire Construction Co.

RICHARD HOPKINS, highway contractor of Albany, N. Y., has been elected to the presidency of the New York State Highway Chapter of the Associated General Contractors of America. Before engaging in road-building work, Mr. Hopkins was a professor of civil engineering at Cornell University.



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WILLIAM H. WATTIS, head of the Utah Construction Co., is president of the newly formed Six Companies, Inc., organized to build the Hoover dam on the Boulder Canyon project, Nevada.

Successful Bidders on

HOOVER DAM

Executives of Six Companies, Inc., which was awarded contract at price of $48,890,995.

W. A. BECHTEL, president of the W. A. Bechtel Co., San Francisco, and past-president of the Associated General Contractors of America, has been selected as the chief managing executive of Six Companies, Inc., on the Hoover dam contract.

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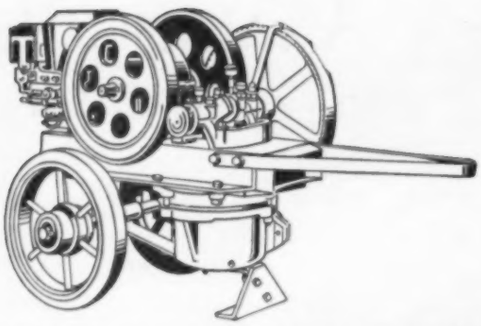

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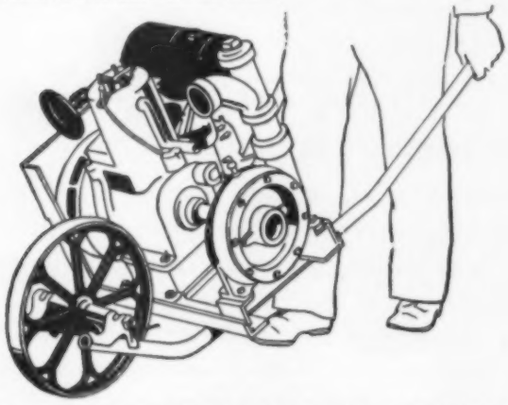
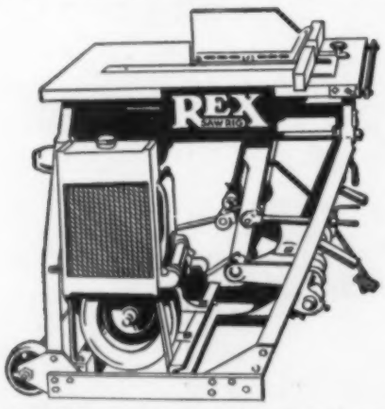


REX WATER BOY—World's lightweight champion—A 2" Centrifugal with ball bearing impeller—Only 23" wide—Weighs but 300 lbs.—Mounted for one-man handling anywhere—Maximum capacity 9300 g.p.h.—Will handle heads up to 50 ft.—1½ h.p. self-oiling, air-cooled engine—But price is only $170.00 f.o.b. Milwaukee.



REX No. 3 SAW RIG—Home Builders' Special—Only 28" wide—wheel-mounted—45 degree tilting table—Improved saw guard—Handles dadoing, mitering, beveling, double-mitering, etc.—3 h.p. self-oiling engine, radiator cooled—Electric motor if desired—Blade cuts off in straight line—no arc. With gasoline engine, $275.00 f.o.b. Milwaukee.

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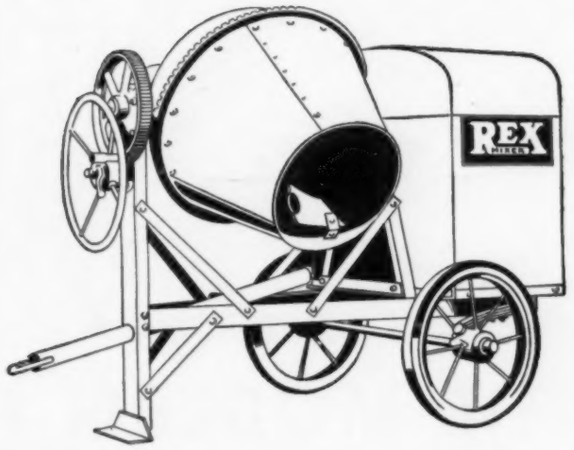
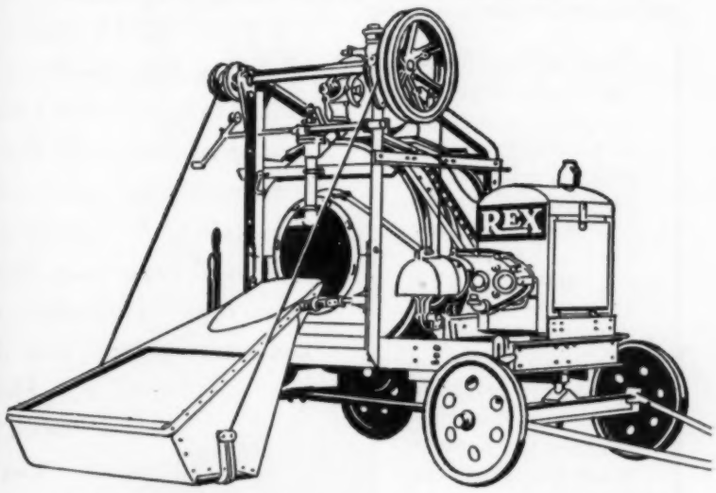


REX TILTER—Try to match it—Full ½-bag capacity—Full 2 h. p. enclosed, self-oiling engine—High tension magneto—Easy dumping hand wheel—Drum lock that locks—The only tilter with automotive springs—Roller bearing wheels—Timken-equipped drum spindle—Easy shoveling height—Dumps cleanly into any barrow—Overpowered, overcapacity—But only $196.80, with steel wheels, cash at Milwaukee.



REX 7-S MIXER—Shimmy skip—All-Steel drum—Steel drum rollers—Timkens—Enclosed, in-oil, cut-gear transmission—7-second skip—7-second discharge—Only 93 inches long—Weighs 500 lbs. less—End controls—Skip knockout—Automotive clutches—But only $805.00 with Le Roi Engine and steel wheels, f.o.b. Milwaukee.

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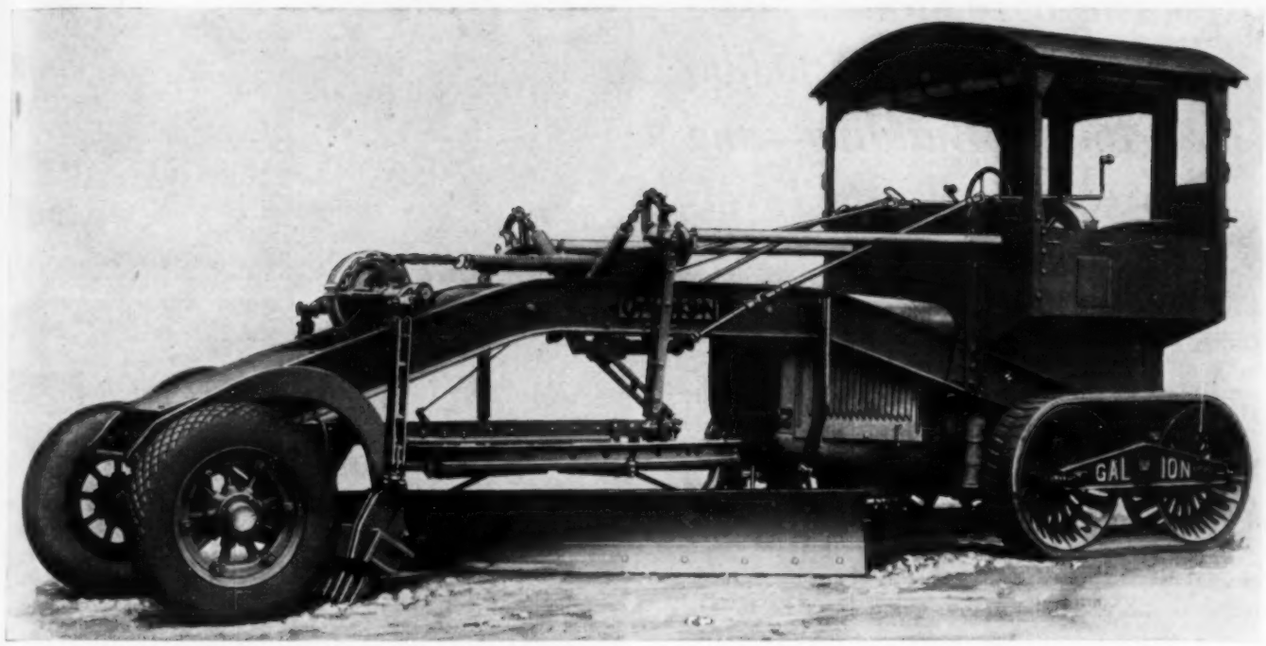

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A choice of McCormick-Deering, Allis-Chalmers, Cletrac, Case or Twin City power, with pneumatic tires, solid tires, Galion Sure-trac Rubber Crawlers or Steel Crawlers, adapts this machine to any requirement.

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UTAH, Salt Lake City—C. H. Jones Co.
VIRGINIA, Richmond—Richmond Machy. & Equip. Co.
WEST VIRGINIA, Huntington—Banks Miller Sup. Co.
Welch—Welch Good Roads Sup. Co.
WISCONSIN, Milwaukee—Badger Trac. & Equipment Co.

The Galion Iron Works & Mfg. Co.
GALION, OHIO . . . . . .

Concrete Takes a Conveyor

How Barber-Greenes speeded up pouring of reinforced floors and footings on $3,500,000 American Can Building—and cut costs to new low levels

Eight Barber-Greene Belt Conveyors were purchased to pour the *floors* of the new American Can Company Building at Chicago, because other methods were too costly and slow.

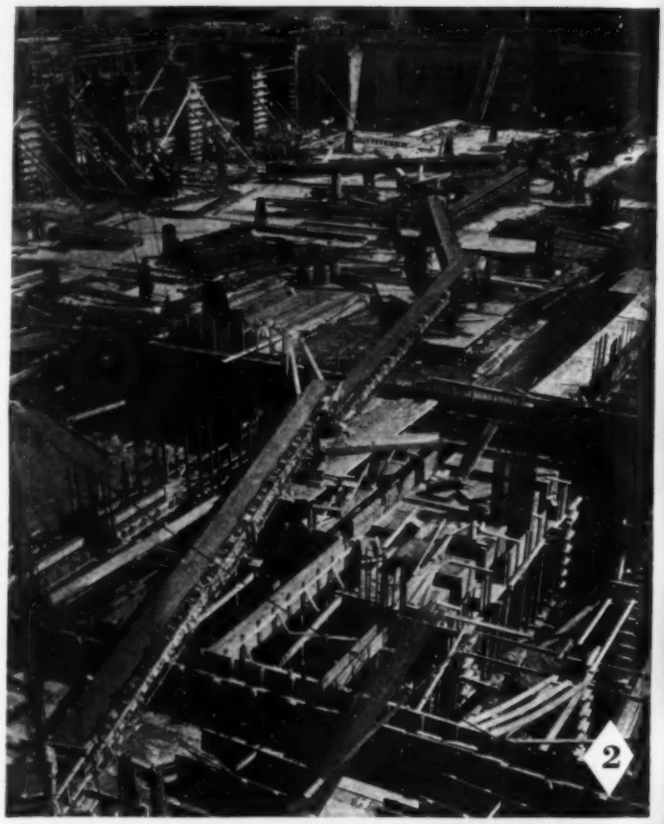
The conveyors pour both footings and floors. The Barber-Greenes poured 14 footings per day. Previously the buggy gang was hard pressed to complete four per day.

Actual figures by Mr. M. Thompson, Supt., showed the price of conveyors was saved before the first floor was finished.

Initial investment of conveyors was about the same as towers, chutes and buggy cost would have been. The average saving was 10 buggy men—2 iron workers—2 puddlers—or $108.00 *per day*, also an increase of 175 yards per day of concrete.

Conveyors were moved from floor to floor by a simple gin pole. Part of the labor gang would come at seven, move the conveyors to the next floor—ready to pour concrete at nine. Eight conveyors moved—two short hours.

◆ ◆ ◆ ◆ ◆



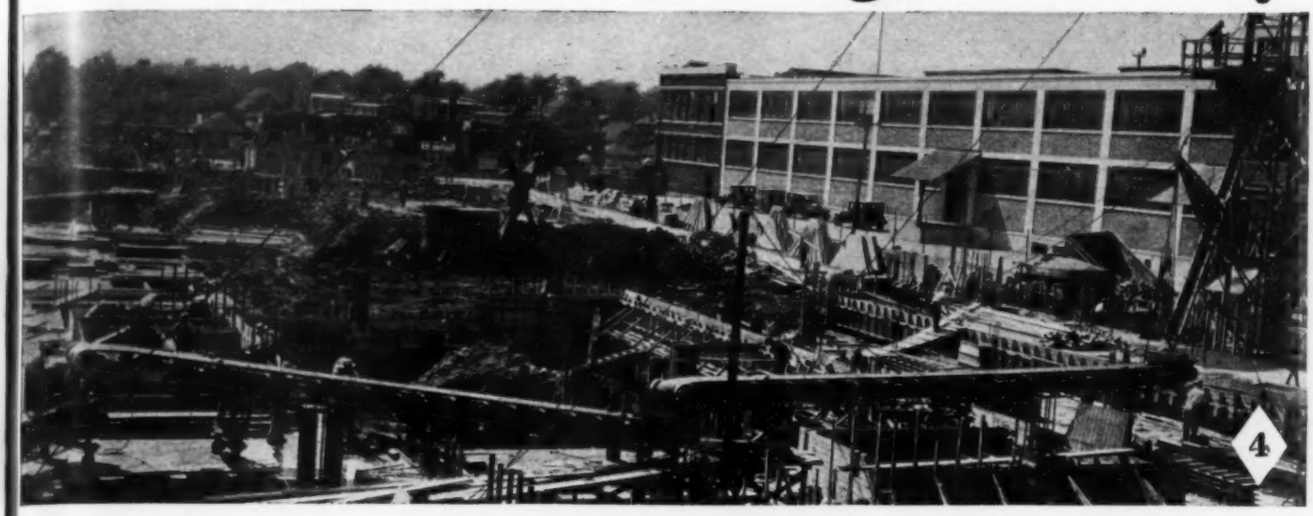
1 *Pouring the floors. The chute is swung to provide a maximum reach with one set-up.*

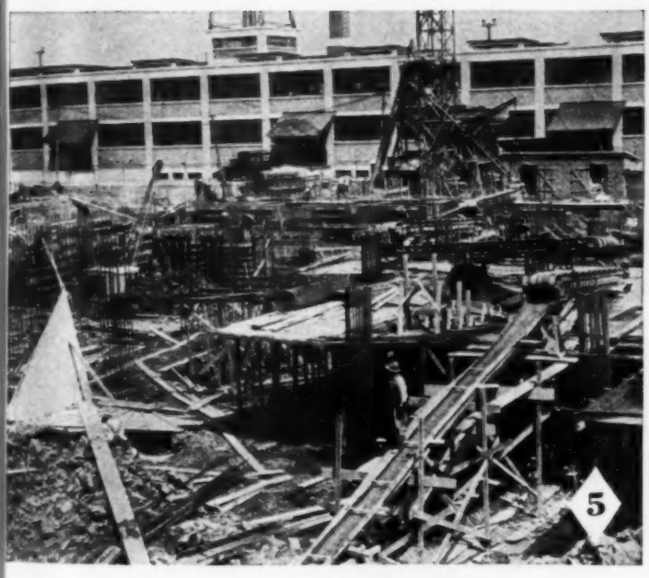
2 *The conveyors are strung out on a floor. As work progresses conveyors are pulled out of the line, until the concrete is brought to the tower.*

3 *Another shot of floor pouring operations. Note men are all finishing. No men pushing buggies.*

4 *The footing pouring set-up. Note how the first conveyor is chute-fed from the tower, and swung from the tower.*

Ride at $108 Saving Per Day





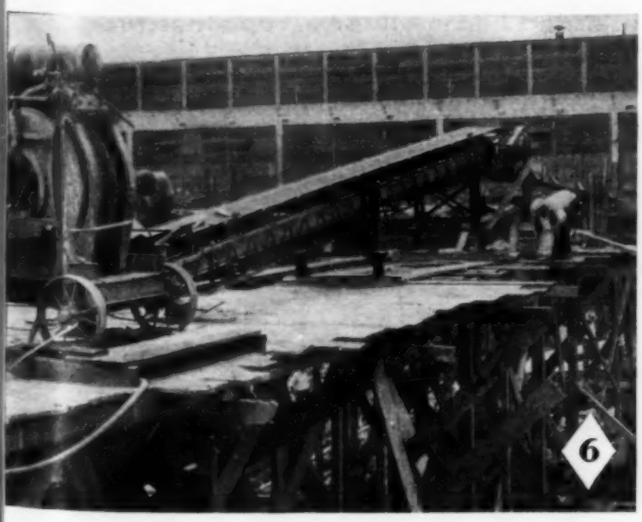
Conveyors poured the floors on which they were set. They rested on 4′ 6″ runways, same as are used for buggies. On the floors Barber-Greenes showed a per yard cost of $0.40, an estimated cost of buggying was $0.75.

And because the concrete received a turnover each time it was discharged from the conveyor to another, concrete strength was even greater with a 45-second mixing cycle than it was with a 90-second mixing cycle. By actual test specimens of concrete that were supposed to have a strength of not less than 2000 pounds, at 28 days, ranged from 4284 pounds to 4810 pounds. Robt. W. Hunt test and inspection.

The five-story building was finished five months ahead of time.

It is for just such speed and cost-cutting reasons as these that contractors everywhere are turning to Barber-Greene Conveyors for concrete handling on big jobs: on medium-sized jobs: on little jobs.

To investigate, ask for a copy of New Applications and Set-ups. It shows where and how Barber-Greenes are being used on a wide variety of concrete pouring jobs. Get your copy today.



BARBER GRE ENE

530 W. Park Ave. Aurora, Illinois

STANDARDIZED MATERIAL HANDLING MACHINES

5 The conveyor chutes the concrete directly into the footings. No buggies are required.

6 A single conveyor used with a one-bag mixer on auxiliary work.

HUNDREDS IN YOUR INDUSTRY HAVE PROVED THE VALUE OF THESE *HEAVY-DUTY* TRUCKS

There is no guess, no experiment on the part of contractors who select Dodge Heavy-Duty Trucks. Business men in your industry and many others have proved conclusively the sound value of these sturdy, modern workers. » » Dodge Heavy-Duty Trucks are available in an unusually wide variety—with payload capacities as great as 11,175 pounds. Inspection—part by part—proves that they are *all truck*—that they are ruggedly built of precision parts. And that all parts are correctly proportioned, one to the other, to insure long, dependable service at low cost. » » No matter how heavy your loads may be, there is a Dodge Heavy-Duty Truck that will fit your needs. So see your Dodge Brothers dealer. See, inspect and test these exceptional trucks. You can buy one complete with standard or special body—at a price you will say is low.

THE COMPLETE LINE OF DODGE TRUCKS RANGES IN PAYLOAD CAPACITIES FROM 1,200 TO 11,175 POUNDS—PRICED, CHASSIS F. O. B. DETROIT, FROM $435 TO $2695, INCLUDING THE 1½-TON CHASSIS AT . . . $595

DEPENDABLE DODGE HEAVY DUTY TRUCKS

USELESS TO PAY MORE *FOOLISH* TO PAY LESS

THE Half Yard Insley is not the lowest priced half yard machine on the market —nor yet the highest . . . Yet no machine selling for less money than the Insley measures up to its high standard of design and performance . . . And no half yard machine selling for more money has any feature of mechanical perfection or performance that the Insley does not have . . A glance at specifications—a comparison of performance records—will prove this . . . Therefore it is useless to pay more—foolish to pay less than the price of the Insley, because either way you fail to get all that your money will buy . . . The Insley is the standard of value of half yard shovels.

Positive flexible clutches connected directly to operating lever.
Roller and ball bearing on every high speed shaft.
High line speed—high swinging speed.
Plenty of power—plenty of weight and stability. . .
Two way steering—two traveling speeds.
Strictly one man control. .

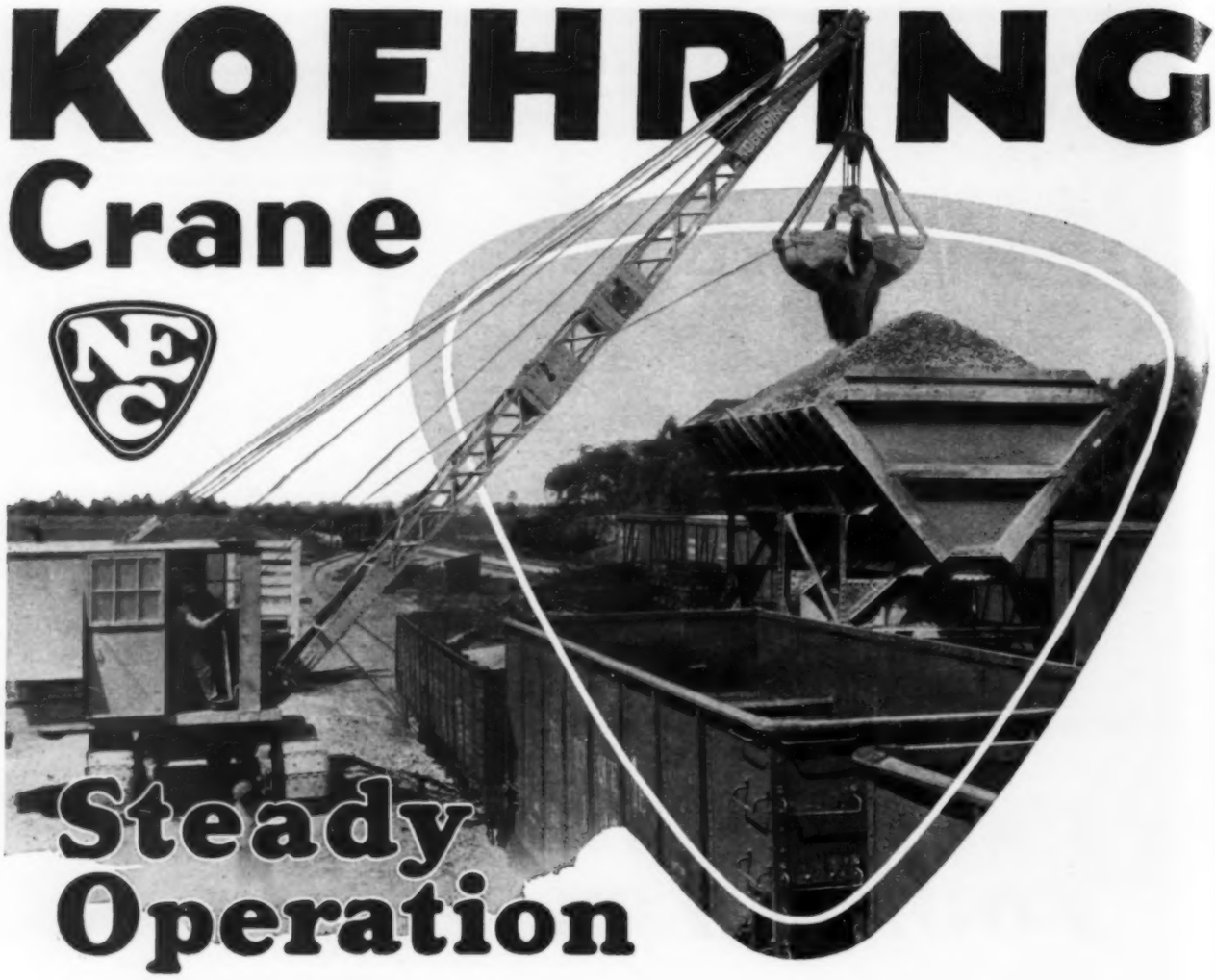
INSLEY

605

National Equipment Corporation

N. 30th St. & W. Concordia Ave., *Milwaukee*

KOEHRING Crane



Steady Operation

A constant flow of power — with a reserve for the peak load requirements— at the greatest speed that keeps the work within easy control of the operator, makes for greater yardage at lower unit cost.

It isn't the spurt of speed that wins. It's the long, steady, continuous pull at a high, constant speed and freedom from interruptions and delays. Heavy Duty construction, ample power, ease of control, — these are the qualities that give the Koehring continuous uniform high-speed performance.

And behind it all is Koehring accessibility . . . simplicity . . . and Koehring *Heavy Duty* construction.

To *know* the Koehring is to discover that there is wide-margin superiority of value among cranes. Why not write for catalog?

Koehring Crane Capacities

Quickly convertible to shovel, pull shovel or dragline.

No. 301—11 tons at 12′ radius. 1 yd. clamshell bucket at 28′ radius, 40′ boom. Other sizes at proportionate radii and boom lengths.

No. 401—15 tons at 12′ radius. 1 yd. clamshell bucket at 34′ radius, 45′ boom. Other sizes at proportionate radii and boom lengths.

No. 501—19 tons at 12′ radius. 1¼ yd. clamshell bucket at 36′ radius, 45′ boom. Other sizes at proportionate radii and boom lengths.

No. 601—21 tons at 12′ radius. 1½ yd. clamshell bucket at 34′ radius, 45′ boom. Other sizes at proportionate radii and boom lengths.

National Equipment Corporation

N. 30th St. & W. Concordia Ave., *Milwaukee*

A6200-I

T. L. SMITH TILTERS

for Central Mixing Plants

FOR years big Smith Tilters have been selected for the big volume concrete jobs which must operate unfailingly day in and day out. Perfectly adapted for the dry-mixed needs of commercial concrete plants.

Smith "tilt-and-pour" discharge insures much *faster* discharge. The drum is power-tilted, batch being discharged directly into the truck. The flow is even, rapid and easily controlled; clogging is impossible. Mixing continues during discharge; no chance for separation.

Weigh-Mix Saves Cost in Plant Construction!

With the Weigh-Mix the Smith mixer is a compact, self-contained unit. No extra weighing hopper needed; no additional headroom or superstructure required. Weighs water, sand, cement and stone. Easy, simple, fast one-man control. Insures *uniformity* of concrete.

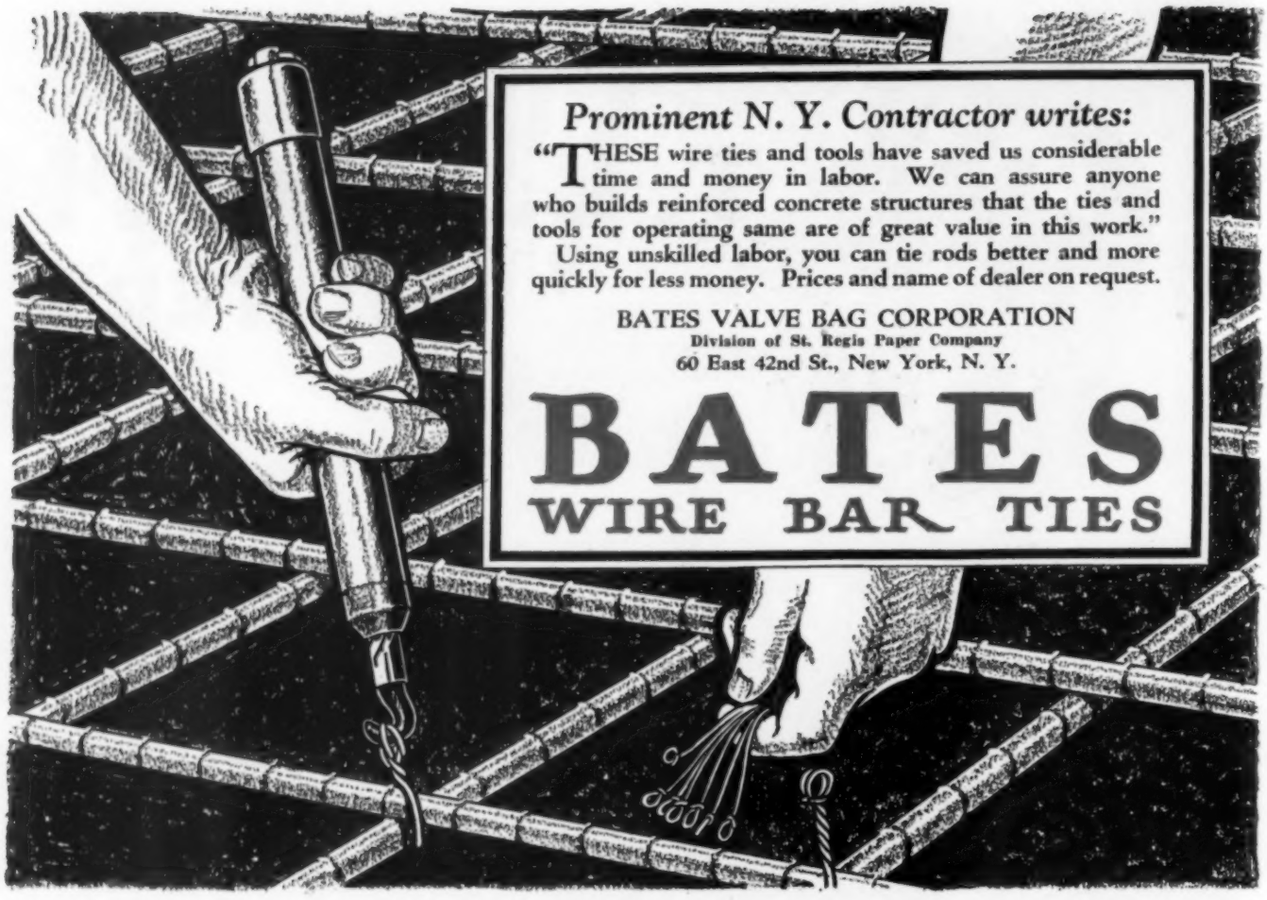
One to Four Cubic Yard Capacities

The Smith mixer line—with or without the Weigh-Mix—gives you the proper capacities for the right sized plant, according to your needs. Write for further information or see your nearest N.E.C. representative.

National Equipment Corporation

N. 30th St. & W. Concordia Ave., *Milwaukee*

A 6220-I



Prominent N. Y. Contractor writes:

"THESE wire ties and tools have saved us considerable time and money in labor. We can assure anyone who builds reinforced concrete structures that the ties and tools for operating same are of great value in this work."

Using unskilled labor, you can tie rods better and more quickly for less money. Prices and name of dealer on request.

BATES VALVE BAG CORPORATION
Division of St. Regis Paper Company
60 East 42nd St., New York, N. Y.

BATES
WIRE BAR TIES

THIS picture is shown against our best judgment. We guarantee our tools **only** for the leverage furnished. There are cases, however, when one is justly proud of what his product will do in spite of the odds.

SEND FOR CATALOG R

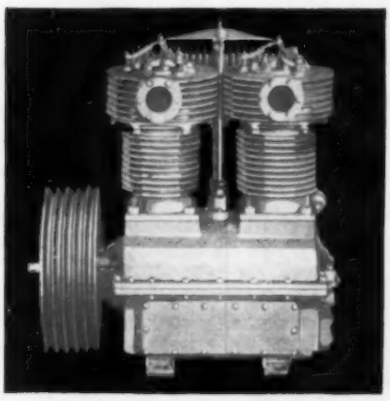
LOWELL WRENCH COMPANY
WORCESTER, MASS.

Of course—your air compressor is a money-maker—

• IF IT'S A DAVEY •

Yes, sir, exactly that. If you're used to thinking about your compressor equipment as "mere overhead," put a "Davey" alongside your others and see how literally it walks away with the cookies!

To prove to yourself just *why*, suppose you check these features against other machines you know best:—



1. *Lightness and strength.* Davey Compressors are much lighter weight than others of corresponding rating; yet actually, they're marvels of stability and sturdiness.

2. *Complete Portability.* Move your Compressor right ahead as the work progresses. No long, permanent air lines necessary.

3. *Many types of Mountings.* If equipment must travel over rough, uneven, hilly, rocky, stumpy, swampy ground, we recommend "Caterpillar" Tractor combination, with Compressor stoutly mounted on Tractor frame, and driven by power take-off from Tractor motor.

Mountings also furnished for McCormick-Deering and Fordson Tractors; or Trailer, Skid, Rail, etc., to meet your convenience.

4. *Advanced Engineering.* Davey Compressor Design and construction represent most advanced thought, of the same high quality found in high-grade automobiles and trucks.

5. *Air-cooled.* Davey Compressors have no water jackets, which tend to retard rather than hasten the cooling of valves. Surplus heat generated by compression is drawn instantly into outside air, through compressor heads and other parts made of aluminum alloy, which, experiment has shown, will transmit heat most quickly.

6. *No Carbon Formation.* Carbon forms only under severe heat. As Davey Compresssors are built with rapid heat-conducting metals, air is kept below the scorching point and carbon cannot gather.

7. *Tool Operation.* Two-cylinder Davey Compressors, rated at 142 cubic feet, deliver more than enough air to operate two cement breakers; two rotating jack hammers in ordinary service; four tie tampers; and other tools of similarly heavy requirements. Three and four-cylinder units of correspondingly larger displacement will be available shortly.

8. *Thoroughly Tested.* Davey Compressors were first introduced five years ago. Years of exacting performance in main types of compressor work have proved their merits. No guessing!

Why *shouldn't* such a carefully-designed, splendidly-built and hard-hitting machine, actually *earn* money for its owner? Here are just seven ways in which it *does* earn. Count these, read them. There are plenty more:—

(a) Lower first cost than other standard makes.

(b) Lighter (greater portability).

(c) Air delivered at the job (no long air lines, costly to install and move).

(d) Inexpensively mounted—use a second-hand tractor if desired.

(e) Sound engineering—little loss in operating time; fewer replacement parts.

(f) Air-cooled. Lower-cost operation where water is scarce; less damage to hose, fittings, tools.

(g) No carbon; hence no cost nor lost time for carbon removal.

Now for the next step, while you're still reading:— why not get *all* the facts? The rest are just as interesting as these: sign the coupon, and they'll start right back to you. A pleasure to us—no obligation to you.

DAVEY COMPRESSOR CO., Inc.
KENT, OHIO
Sales Representatives in All Principal Cities

DAVEY AIR COOLED AIR *Compressors*

Davey Compressor Company, Inc., Kent, Ohio
Send me the story of the 500 hour competitive tests in the booklet "Four Air Compressors Went to School."

Name_____

Address_____

Post Office_____ State_____

Company_____ Position_____

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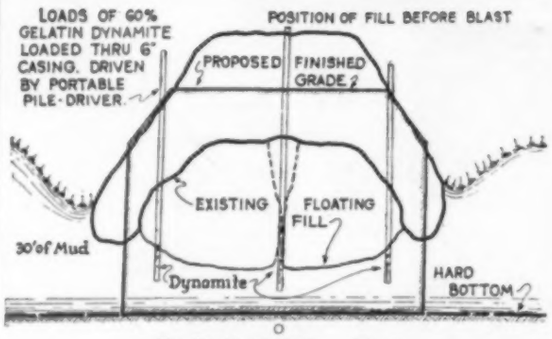
DYNAMITE—



Re-Built Fill Over Mud

Dynamite Loading Through 6-Inch Pipe

Fill Piled Up Before Blasting

Result of Blast

SIGNIFICANT evidence of the attention being given to the methods of applying explosives to displace unstable material underlying highway fills is found in the following conclusions stated in the 1930 *Report of the American Road Builders' Association* by the *Committee on Grading Methods:*

> ***"Swamps, marshes and peat bogs represent the most treacherous areas over which modern highway embankments are constructed."***
>
> ***"The use of explosives is particularly successful in displacing underlying unstable material and compacting embankments in such areas."***

Modern traffic requirements demand the shortest distance between terminals, efficient planning of the roadway, permanent construction and *minimum cost* of *maintenance.*

Permanence of Fill Sections Will Reduce Highway Maintenance Costs

Solid foundations are as essential for permanence of highways as they are for the modern skyscraper, bridges and other structures. Why expect a highway to remain in its original condition when founded upon "unstable material" as the Grading Committee classifies such a "foundation?"

There are thousands of miles of highways now crossing swamps and other treacherous soil formations. Millions of dollars are spent to restore to grade these sunken highways. Permanence of the highway grade can be assured by placing fills upon permanent foundations. "Unstable material" below the fill or upon the site of new highways can be

Displaced Quickly, Cheaply and Simply by the Use of Explosives

The employment of explosives provides an ample force to dislodge the mud, peat or other material; requires no extensive machinery to purchase, operate and supervise, and the methods of using dynamite are sufficiently variable to be applicable in any locality. Here are the ways some fill settlement projects have been handled:

DU PONT
REG. U. S. PAT. OFF.

Is Now Successfully and Economically Used to Displace Soft Material BELOW Highway Fills

1 The surface of the selected site is covered with turf and tree roots, which are torn apart, and the earth loosened and liquefied, by exploding charges of 50 per cent du Pont Ditching Dynamite at definite locations, and using the propagation method of firing the explosive charges. An even settlement by gravity results and none of the fill has been wasted.

2 Where a hard-surfaced highway is constructed over an old road-bed, the fill material is placed where required. Charges of 60 per cent du Pont Gelatin Dynamite are located in the muck by the use of pipe casings as shown in the diagram and illustrations at the left. Following the explosion, the mud is replaced by the fill material settling to a firm foundation.

3 If a *new alignment* of the road-bed is required, 50-pound cases of 60 per cent du Pont Gelatin Dynamite are placed upon the surface at designated points. The fill material is placed on top of the charges as shown in the diagram and illustrations at the right. Settlement of fill material follows the explosion, and a permanent base is obtained.

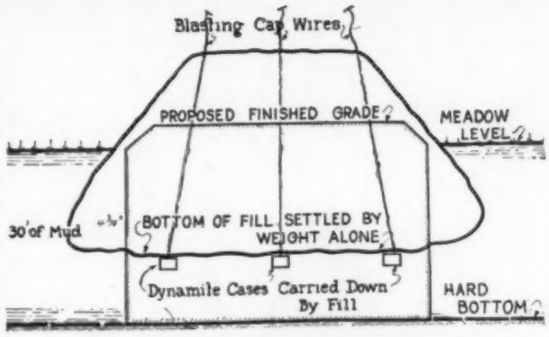
The Saving of Time, Labor and Money Commends the Explosives Plan

Here is a practical, efficient and economic plan to reduce maintenance costs of highways now in service, and to ensure the permanence of future road-beds. The methods mentioned have proved efficient, and are being employed successfully in many localities.

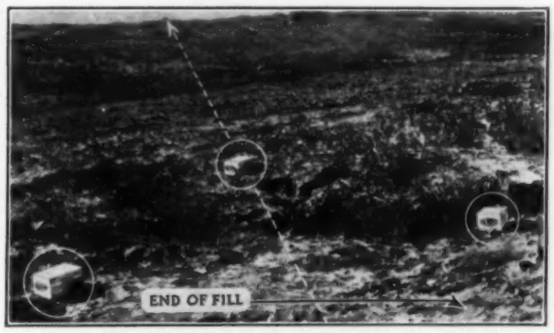
Our explosives engineers are observing and reporting on fill settlement projects in many sections of the country. Their findings are available to engineers, contractors and officials engaged in constructing and maintaining highways. Your inquiries and problems are invited in the interest of better highways, lower maintenance costs and public satisfaction.

E. I. du Pont de Nemours & Co.
Incorporated
Explosives Dept. Wilmington, Delaware

DU PONT
REG. U. S. PAT. OFF.



Dynamite Pushed Down by Weight of Fill



Dynamite Cases Placed on Three-Point Loading

Three-Point Fill Ready for Blast

Result of Blast

INSTANTLY POPULAR!

Instant popularity has been achieved by the new Cleveland Flaming Torch.

It was to be expected, for nowhere else is such torch efficiency, value and economy offered at such an interestingly low price.

The burner is specially designed to give a full visible flame, in all weather—burns as long as 48 hours. Low center of gravity and shape of torch makes it stay where it is put. Handle nests and is looped so torch can be suspended.

This is the torch you will want to use on your job. Write us for prices and details.

Some desirable dealer territory is available

THE CONSOLIDATED IRON-STEEL MFG. CO.
1290 E. 53rd St., Cleveland, Ohio

CLEVELAND FLAMING TORCH

The first **6**

★ Self-lubricated axle bearings. « « « « No oiling needed. Wheels easier. « «

★ "V" shaped pressed steel tray braces. Greater rigidity. « « Can't twist. « « « «

Sterling

FEATURES contributing to LOWER OPERATING COSTS

» » thru More loads per man per day. Increased manpower, thru perfect balance. Lowered maintenance, last longer, interchangeable. Raised efficiency, exact sizes. Prompt field delivery. Write for Full Facts!

★ 10-spoke wheel, instead of 8. Smooth flush riveted spokes.

★ "V" braced channel steel legs, riveted. Strength with light weight. « « « « «

★ Axle keyed to Malleable iron brackets. No nuts to loosen. « « «

★ Malleable iron wheel guards, insure protection, easier dumping.

No. 6A—A. G. C. for dry material. Capacity 3½ cu. ft. All Sterling barrows have reinforced tray tops and corners. This is the most popular general type barrow.

No. 11—Coal and ash type. Capacity 6 cu. ft. or 350 lbs. Easiest wheeling big load barrow made. Built extra strong and rigid for tough work.

No. 10A—Wide tray, capacity 4½ cu. ft. A. G. C. standard. Fits all contracting requirements and built to give the longest service. Solid and strong

No. 6—The strongest built cart on the market. Full capacity body, no axle inside. Capacity 6 cu. ft. or 1200 lbs. Perfect balance and easiest wheeling. 42" wheels.

STERLING WHEELBARROW COMPANY
MILWAUKEE WISCONSIN

WAREHOUSES: CHICAGO, NEW YORK, PHILADELPHIA, PITTSBURGH, CLEVELAND, DETROIT, ST. LOUIS. DISTRIBUTORS IN ALL PRINCIPAL CITIES.

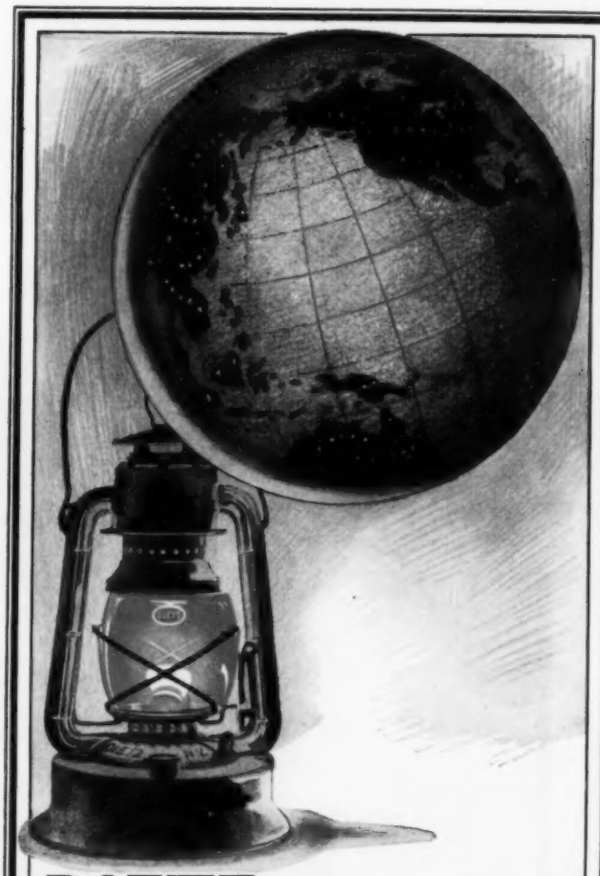
PORTER HKP

PORTABLE
HAND OPERATED
CUTTING TOOLS

Along the sides of this advertisement we show the cutting jaws of several Porter Tools and below, close up views of these tools in use — Shear Cutter on wire rope, Angular Cutter on tie wire, Nut Splitter ready to remove nut, End and Angular Bolt Clippers and the Chain Cutter. These represent popular models in a line of 60 powerful portable hand operated cutting tools—all of them built on the lever and toggle joint principle which multiplies applied power about 70 times. The largest Bolt Clipper cuts annealed bolts in the thread up to 3-4 inch. The Shear Cutter has a maximum capacity of 5-8 inch soft wire rope or 1 1-2 x 9-32 inch soft bars. Porter Tools are quick — they save time and labor in production, maintenance, dismantling and repairs. They are used in practically every industry.

Write for descriptive literature — ask your jobber.

H.K. PORTER INC.
38 Ashland Street
EVERETT, MASS.



DIETZ RED LANTERNS
Dot the Highways of the World

Use **RED!** *No other color means danger*

TRAVEL the world over and you will find Dietz Lanterns dotting the roadsides at night—their faithful beams peacefully defying the gales and storms of every land—their red lights flashing universal danger signals, instantly understood in all languages.

The superior lighting power and burning dependability of Dietz Lanterns affords lowest cost protection to traffic and contractors alike. You cannot afford to risk use of warning lights less tried and true.

R. E. DIETZ COMPANY
NEW YORK

Largest Makers of Lanterns in the World

FOUNDED 1840

DIETZ LANTERNS

first

Long Beach Calif.

now

Portland Maine

THIS is another coast-to-coast example which shows that "VULCAN" Pile Hammers "go far" to render good service to the contractor.

Recently in this space Vulcan Hammers were shown in service driving the piles for the great new Procter & Gamble plant at Long Beach, California. Now, cross the continent, at the Atlantic seaboard, Vulcan Hammers are pictured at work on the new railroad terminal wharf of Portland, Maine.

And it was the same contractor in both instances,—that progressive contracting organization, Merritt-Chapman & Scott.

Here at Portland there were 9000 piles to be driven, measuring 100 to 110 feet long. In places where the top crust was too hard to permit the piles to be pulled down into the 76-foot leads, a hole was first punched with a shorter pile.

A distinguishing feature of all Warrington-Vulcan Pile Hammers is that they embody the true *punching* action, the utmost in *driving* power, due to their correct engineering design.

VULCAN IRON WORKS
CHICAGO·U·S·A

VULCAN IRON WORKS
327 No. Irving Avenue, Chicago, Illinois

Southern Representatives:
Woodward, Wight & Co., Ltd.,
451 Howard Ave., New Orleans, La.

Representatives for California, Nevada, and Japan:
Harron, Rickard & McCone Co.,
1600 Bryant St.,
San Francisco, Calif.

Representatives for the States of Washington and Oregon:
A. H. Cox & Co., Inc.,
1757 First Avenue, S.,
Seattle, Washington

Warrington-Vulcan

Astonishing new

WESTERN SPRING WIND-UP

saves cost of wagon man!

Speeds production . . .
Acts instantly . . .
Closes doors tightly . . .

all Western Crawler Wagons can be equipped!

No wagon man needed with Western Crawler Wagons equipped with Spring Wind-Up. Dump boss or tractor operators trips loads and winds up doors.

NOW contractors can actually add money to their profits that used to be spent for an extra man to trip loads and wind up doors!

This important saving is made possible by the remarkable new Spring Wind-Up for Western Crawler Dump Wagons. It is a simple, easily operated door control device that can be readily attached to both direct-hitch or front truck wagons and needs no special connections on the tractor.

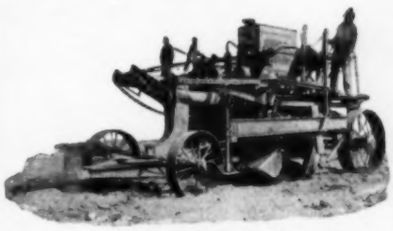
No complicated mechanism or outside power is required. Gravity and spring action do all the work and it operates equally well at all temperatures. A single pull on a rope running to the tractor, or a single pull on the lever by the dump boss trips the load. A second pull closes the doors after the wagon has moved free of the dumped load. A large torsion spring closes the doors instantly even under the severest conditions.

This instantaneous action enables Western Crawler Dump Wagons to be used on even the shortest hauls without having to wait for the door wind-up! On *all* hauls the new Spring Wind-Up is ready for reloading more quickly—increasing daily yardage. Write today for facts about the Spring Wind-Up on new or present equipment. The Austin-Western Road Machinery Co., 400 N. Michigan Avenue, Chicago, Illinois. Branches in principal cities.

NOW!
Greater Capacity

New Austin Contractor's Special Elevating Grader

THE FINEST AUSTIN ELEVATING GRADER EVER BUILT. Strength—capacity—output—smooth operation—durability—all are obvious when you've seen it perform. Motor driven carrier enables it to develop maximum capacity regardless of soil conditions. Has longer guard rollers under discharge to avoid damage from wagons—heavier supporting chains—higher steel side boards, improved all-metal belt drums—sturdier frame—larger plow beam and stronger engine hitch.



New Western No. 6 Elevating Grader

The new Western No. 6 Elevating Grader, too, has engine mounted on the machine to operate the carrier. 10-inch steel tube "backbone" provides a powerful frame to withstand the twisting strains from a heavy load on the carrier. Three-point suspension principle stops frame distortion and "floating" belt trouble. Other details: Girder front axle and "H" beam tongue with a powerful coil spring to take up starting shocks, ball and socket front end, new control for plow regulates pressure and permits cutting harder ground than ever before.

Austin-Western
ROAD MACHINERY

Fitting Your Business —Fitting Your Pocketbook

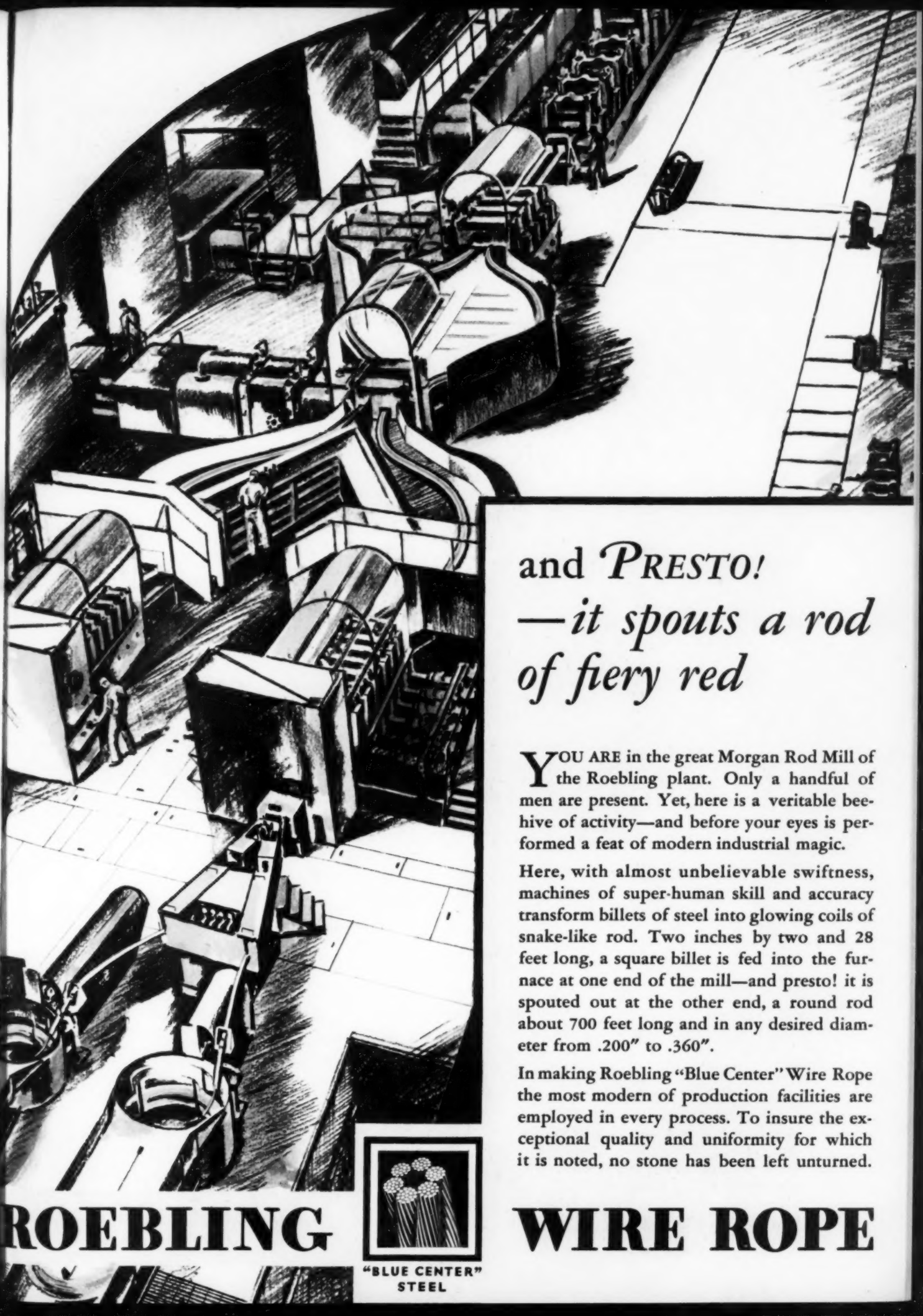
Reo fits your haulage requirements by constantly introducing new ideas in bodies.

Reo fits your pocketbook with economies resulting from its quick acceleration and deceleration in traffic — with further economies resulting from its all-day, all-year, long-life stamina.

Carefully engineered, with friction and vibration reduced—made of finer metals, and the chassis balanced and free of excess dead weight, Reo is needed in your business for the most profitable haulage.

REO MOTOR CAR COMPANY, LANSING, MICHIGAN

SPEED WAGONS REO AND TRUCKS



and *PRESTO!* —*it spouts a rod of fiery red*

YOU ARE in the great Morgan Rod Mill of the Roebling plant. Only a handful of men are present. Yet, here is a veritable beehive of activity—and before your eyes is performed a feat of modern industrial magic.

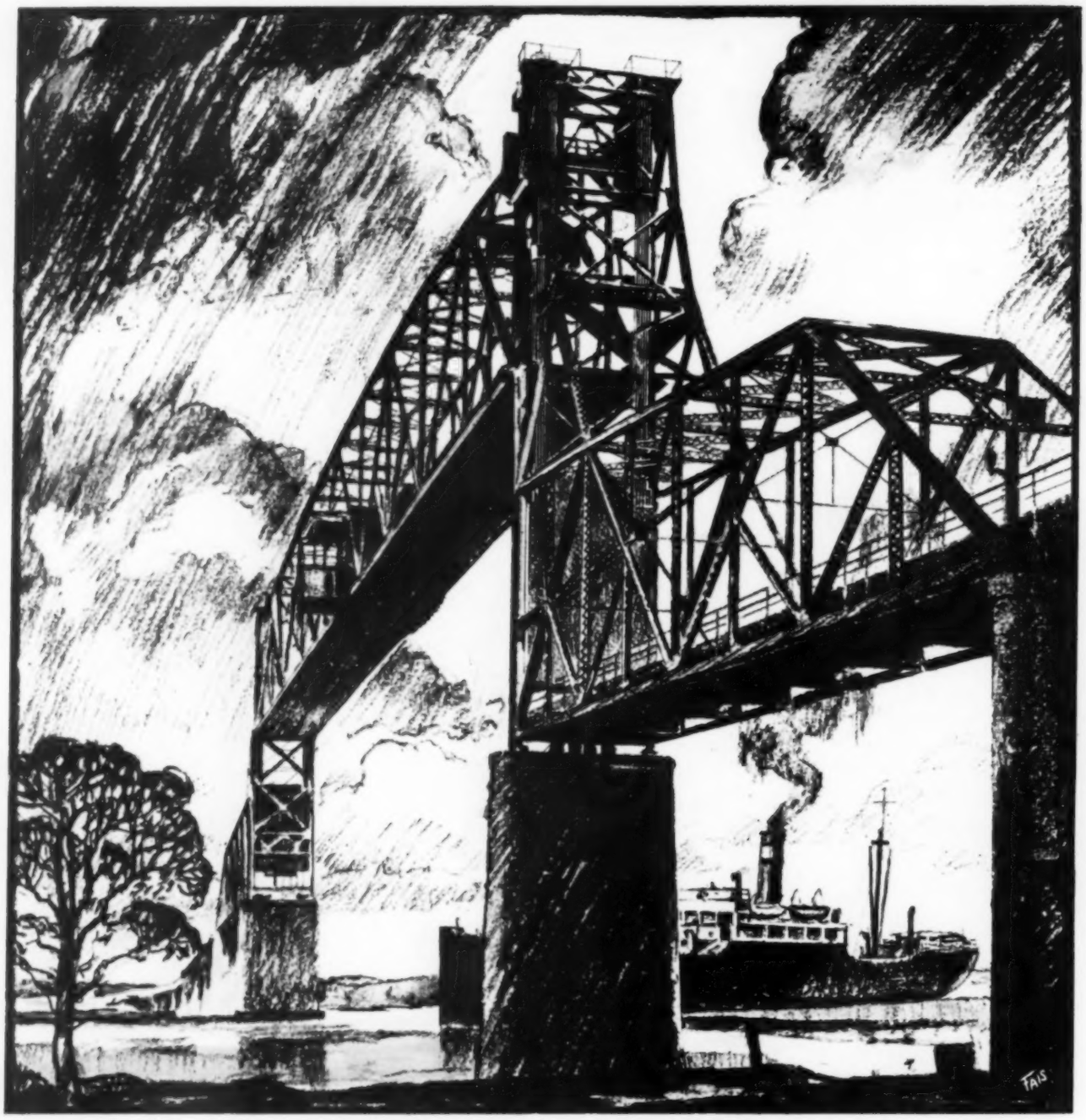
Here, with almost unbelievable swiftness, machines of super-human skill and accuracy transform billets of steel into glowing coils of snake-like rod. Two inches by two and 28 feet long, a square billet is fed into the furnace at one end of the mill—and presto! it is spouted out at the other end, a round rod about 700 feet long and in any desired diameter from .200″ to .360″.

In making Roebling "Blue Center" Wire Rope the most modern of production facilities are employed in every process. To insure the exceptional quality and uniformity for which it is noted, no stone has been left unturned.

ROEBLING

"BLUE CENTER" STEEL

WIRE ROPE



Burlington-Bristol Bridge. Designed by: Ash-Howard-Needles & Tammen, Kansas City, Mo. General Contractors: McClintic-Marshall Co., Pittsburgh, Pa.

For world's longest lift span

THIS imposing structure is an outstanding example of bridge building. It is the Burlington-Bristol Bridge —spanning the Delaware River between Burlington, N.J. and Bristol, Pa.—and has the world's longest lift span.

Counterweight and operating ropes—used for elevating and lowering the 1300 ton lift span—are of Roebling manufacture. 64 pieces of Roebling "Blue Center" Steel Wire Rope, 2 inches in diameter, are used for the former and 16 pieces, 1⅜ inches in diameter, are used for the latter. Incidentally, over 8000 feet of pre-stressed Roebling Wire Rope were used for temporary cables in erecting the lift span by the cantilever method.

This preference of Roebling Wire Rope for outstanding projects such as this one is not mere coincidence. It is the inevitable result of the exceptional safety and dependability which Roebling Rope has demonstrated throughout years of service.

JOHN A. ROEBLING'S SONS COMPANY
WIRE... WIRE ROPE... WELDING WIRE... FLAT WIRE
COPPER AND INSULATED WIRES AND CABLES
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TRENTON, N.J. *Branches in Principal Cities*

ROEBLING "BLUE CENTER" STEEL **WIRE ROPE**

Sturdy Electric Drills
for Heavy Construction Work!

Ideal Wood Boring Tools for Building Bridges and Piers

THESE two drills—the most powerful that Black & Decker produce—will lighten any heavy drilling job.

Pictured above is the big, rugged, No. 8 size, with capacity from 59/64″ up to 1 1/2″ in steel and up to 4″ in hard wood (with proper auger bit attachment).

Its mighty Universal Motor, operating on A. C. or D. C., can be furnished for 110, 220 or 250 volts as desired. No load speed, 350 R. P. M. Ball Bearing construction throughout, plus adequate air-cooling to prevent overheating.

No. 4 Morse taper socket is fitted into spindle shaft with a large, knurled nut, designed to hold bits securely but to permit ready removal.

The 1-inch size, pictured at the left, is very similar in construction. Capacity up to 1″ in steel and 3″ in hard wood. Weight, 26 lbs. Also equipped with No. 3 Morse Taper Socket.

Both Drills are fitted with detachable side handles.

The No. 8 is equipped with special quick-release safety switch.

Other drills available from 3/16″ capacity up.

See These Drills at Your Distributor's

Mail Today for **BLACK & DECKER** ***Complete Catalog!***

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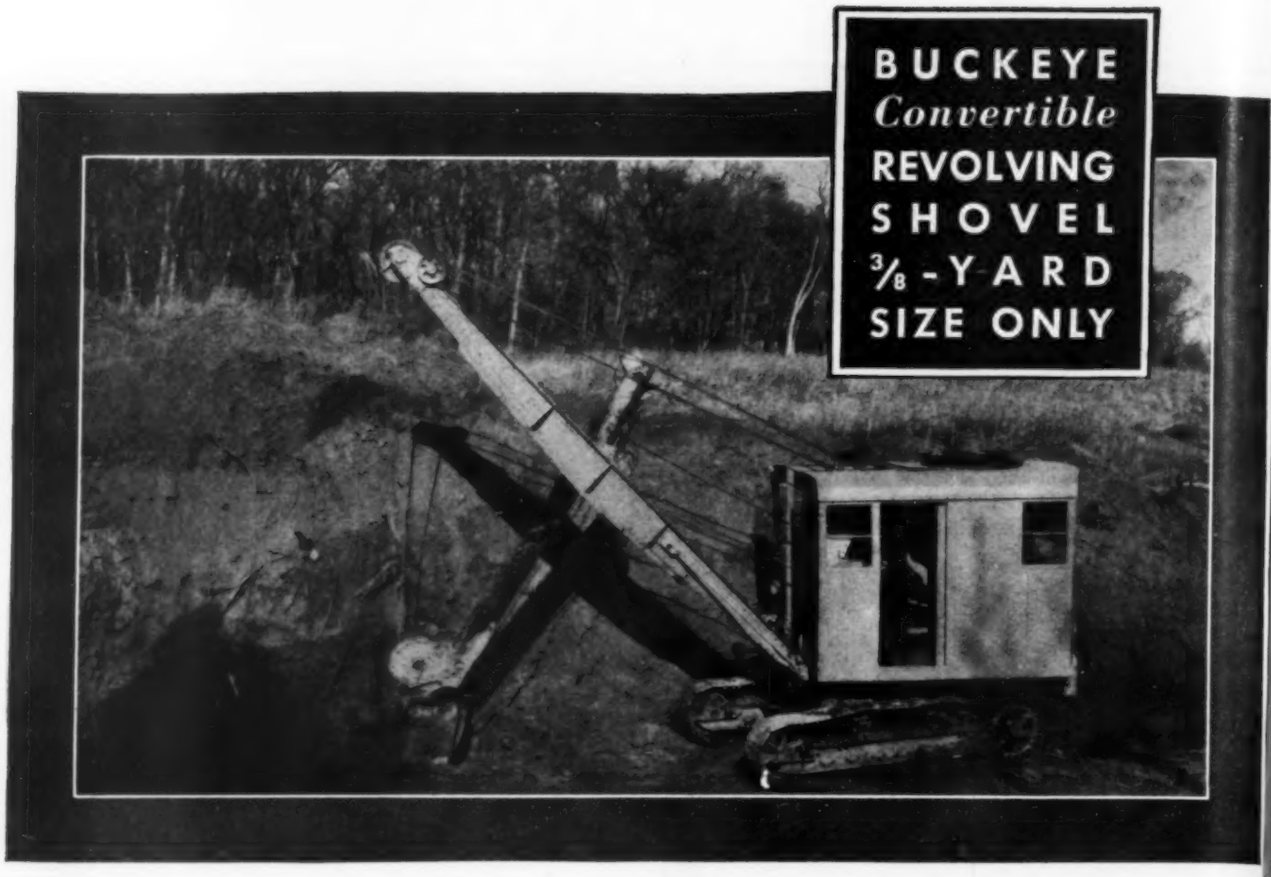

CRANE ✓ CLAMSHELL ✓ DRAGLINE ✓ SHOVEL

all as required in a day's operation

Model O meets the urgent present-day need for a smaller—*⅜-yard*—revolving shovel-crane offering greater utility at lower cost.

Ruggedness is the dependable foundation upon which this Buckeye is built. From steel-treaded crawlers to manganese dipper, it is entirely capable of giving continuous service in varying materials and under shifting conditions. Rotating and traveling bases are sturdy, one-piece electric steel castings. Heavy-duty gasoline motor is mounted on a solid cast sub-base, forming a complete assembly with the radiator, clutch and two-speed transmission unit. 19-foot boom combines flexibility with strength, and is rigidly reinforced against side-wise distortion. A one-piece casting, the dipper has a capacity of .444 cubic yards, struck measure. Double dipper stick, of rectangular box construction, passes through inside of boom. Fast hoisting, swinging and crowding speeds are supplemented with easy, one-man control.

As required in a day's operation, Model O is readily convertible to Crane, Clamshell, Dragline and Shovel service. Its extremely diversified working ability increases its range of usefulness—multiplies its earning capacity. May we send you itemized specifications and the interesting price of this Buckeye?

THE BUCKEYE TRACTION DITCHER CO., FINDLAY, OHIO

for over thirty years

Buckeye ✓

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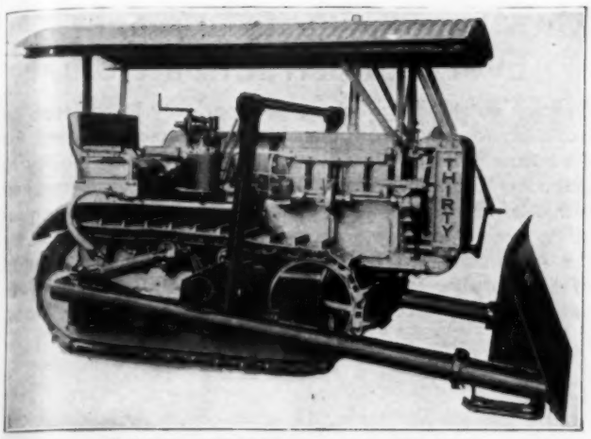
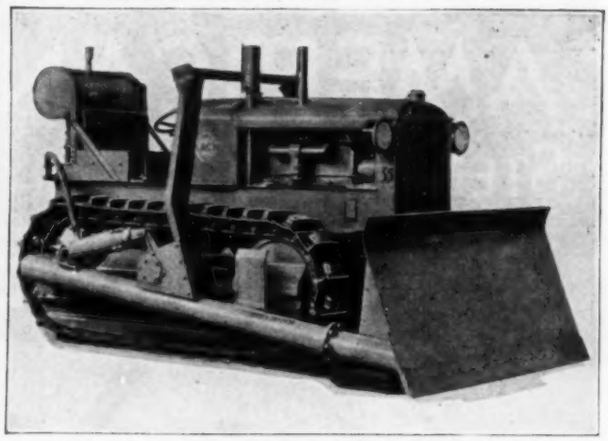


Model No. 51 Bulldozer for Caterpillar "30"



Model No. 52 Bulldozer for Monarch "35"

A Brand New Idea In Bulldozers

Remarkable Strength Combined With Extremely Light Weight And Unusually Rapid Operation

On Caterpillar "30"

On Monarch "35"

BAKER Twin Cylinder-Balanced Hydraulic Bulldozers

FOR CATERPILLAR "30" — MONARCH "35"

After the performance of these outstanding Bulldozers on the severest types of work, contractors have found out these facts:

Blade lifts to full height in 2 to 4 seconds—works 8 to 10 inches below tractor tracks—blade lifts 26 to 28 inches above ground—weight one-third to one-fourth less than other types—less wear and tear on tractor—stand up easily under heaviest work—draw bar absolutely clear for pulling other equipment—weight evenly balanced over center of tractor tracks—small size permits working in close quarters — twin cylinders, operating lifting cranks mounted on Timken Bearings, make easy operation.

Isn't that about everything you want in a Bulldozer? Write for special Bulletins.

(See Coupon Below)

Other Baker Products For Earth Moving

BAKER TRACTOR EQUIPMENT
EARTH MOVING-ROAD MAINTENANCE-SNOW REMOVAL

For Contractors and Road Officials

BAKER MANEY SELF-LOADING SCRAPERS—The old reliable tractor scrapers now made with Timken Roller Bearings in 1½ and 1 cu. yd. capacities. Lowest cost earth movers—greatly improved—stronger than ever.

BAKER ONE-MAN AUTOMATIC ROTARY SCRAPERS—For any tractor, 4 sizes, 14 to 40 cu. ft. capacities. Simply operated—large capacity. Ideal for your short haul earth work.

BAKER ROAD ROOTERS—These powerful scarifiers can be accurately adjusted for depth. They thoroughly root up hardest surfaces and save wear and tear on grading equipment.

Mail coupon to BAKER MFG. CO., 568 Stanford Ave., Springfield, Ill.

Baker Maney Scrapers

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Baker Road Rooter

Please send literature on the following:
Bulldozer for Caterpillar "30" ☐ Monarch "35" ☐
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Baker Maney Scrapers ☐ Rotary Scrapers ☐ Rooters ☐
Name .....
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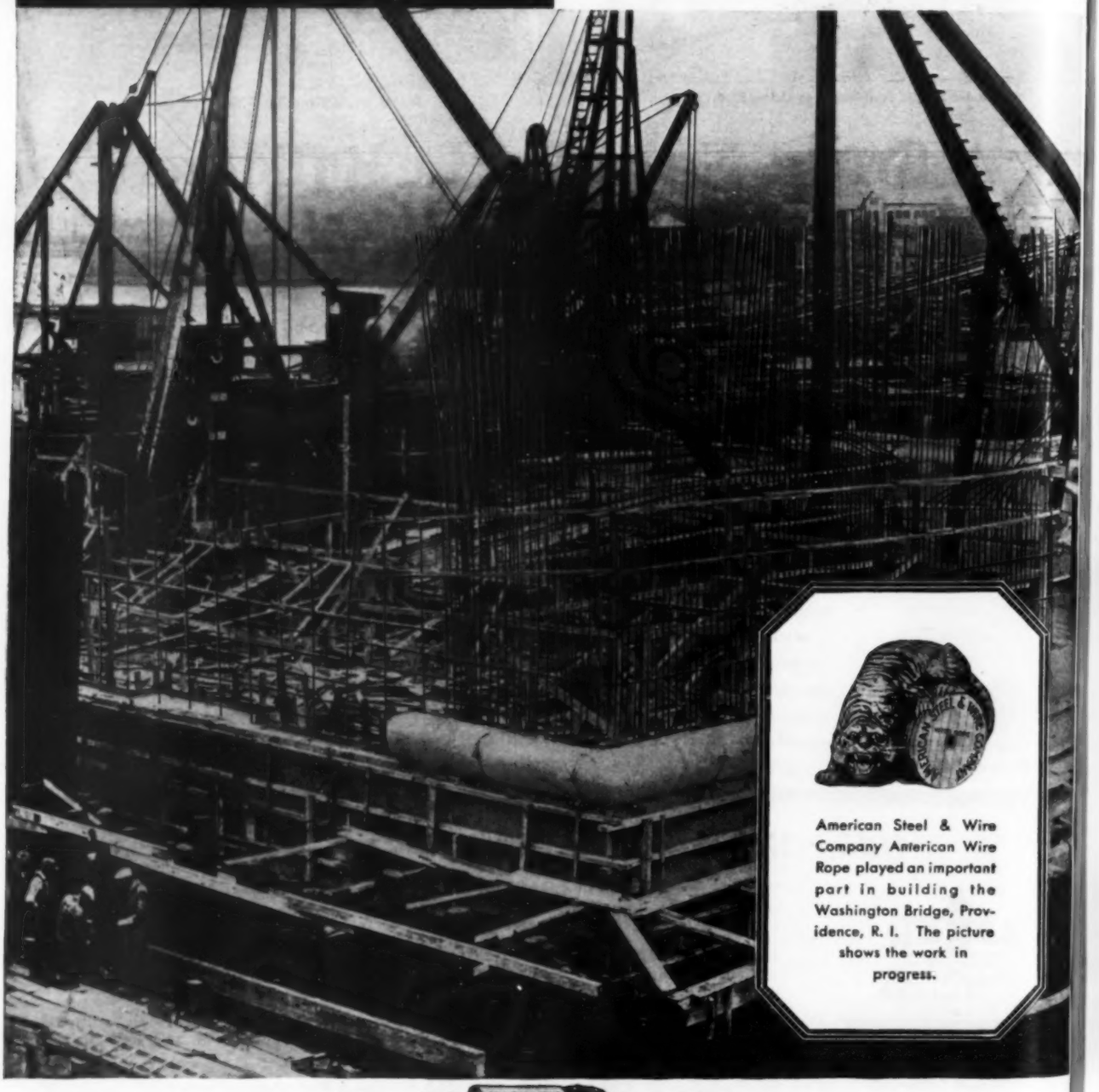
AMERICAN STEEL & WIRE COMPANY WIRE ROPE

Meets . . . . . Every Construction Demand

Only an outstanding degree of superiority in construction work, could have won an almost universal demand for American Steel & Wire Company Wire Rope. Ability to stand up under the most gruelling punishment—marked reduction in replacement costs—and constant dependability, are reasons why it is generally specified. Made by the American Steel & Wire Company—you are assured of dependable service and a rope exactly suited to your needs. Today—consult our nearest office or distributor.



American Steel & Wire Company American Wire Rope played an important part in building the Washington Bridge, Providence, R. I. The picture shows the work in progress.

1831 — 1931

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AMERICAN STEEL & WIRE COMPANY

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Take This Good Advice about Waterproofing and Dampproofing

On important waterproofing, dampproofing or protective coating work, obtain specifications and able advice from a reliable material manufacturer. His reputation as well as yours is at stake.

Headley Emulsified Asphalts

Can be used for these purposes:

Dampproofing and waterproofing of foundations, basements, tunnels, reservoirs, pits, cisterns, tanks, floors, walls, roofs, etc.

Protection of concrete and masonry against disintegration.

Protective coating of concrete, masonry, structural steel, pipe lines, metal, etc., against the destructive influences of fresh and salt water, moisture, gases, chemical fumes, brine, acids and alkalies, etc.

Bonding and cementing bituminous flooring, linoleum, plaster, stucco, tiles, blocks, slabs, bituminous bridge and crossing planks, fibrous and mineral wall boards, cork board and other insulation, etc.

And for these reasons:

Flow freely from the container.

Can be sprayed, brushed or squeegeed without dilution, and may be used with saturated cotton fabric for membrane work.

Applied cold at any temperature above 35° F.

Spread uniformly and bond securely to cold, wet or damp surfaces.

Set readily and dry in a few hours, thereafter thoroughly resistant to moisture, acids and alkalies.

Continuity, ductility and imperviousness of finished coating fully and permanently retained. No cracking, creeping or flowing under service conditions.

As compared to solid asphalts:
No cutting of drums, waste of material and no preliminary time losses—No heating kettle, fuel, mops or skilled labor—No burns for the workmen.

As compared to "cut-backs":
No beneficial properties lost—No flammable or toxic fumes to create fire hazard or menace health—Odorless—Tasteless—No contamination by contact.

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Not destroyed by freezing before or after application—No settling out or deterioration after long storage—No clay or other injurious adulterants—Not reversible after setting and subsequent contact with water—No disintegration of coating in service.

HEADLEY Emulsified Asphalts are distinguished by high quantity and quality of the asphalt content, low water content, advantageous nature of their soap emulsifier, resistance to damage from freezing, and perfect applicability to cold or damp surfaces.

CLIENT or customer wants *your* assurance and will hold you to it. In his opinion, you do the selecting and are responsible.

If the waterproofing material you select fails in service, you get the blame and suffer the loss of confidence.

When you specify Headley Emulsified Asphalts, you will make friends of your customers and through your own good judgment create good will that becomes a powerful asset.

Those familiar with Headley Emulsified Asphalts will tell you that they are easy to apply and low in cost per unit area in place, meeting every requirement for thorough and permanent waterproofing, dampproofing or protective coating operations. They are safest for both contractor and owner.

Headley Products merit their well-known reputation.

We offer the benefit of our experience wherever doubt exists as to materials and method of application. We will gladly submit specifications for efficient economical application under definite conditions.

Use the accompanying coupon to ask for Bulletin No. 330 and a free sample which will enable you to see the positive merit of Headley Emulsified Asphalts.

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Emulsified Asphalts for Industrial Uses
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Gravity

COMBINES in one heavy duty unit features of Truck, Tractor, Trailer and Bulldozer. Gear drive. Auxiliary rear axle carries full load.

Capacity, 4 yards.
With Sideboards, 5 yards.

Goes where trucks cannot.

Increases capacity of power shovels and elevating graders.

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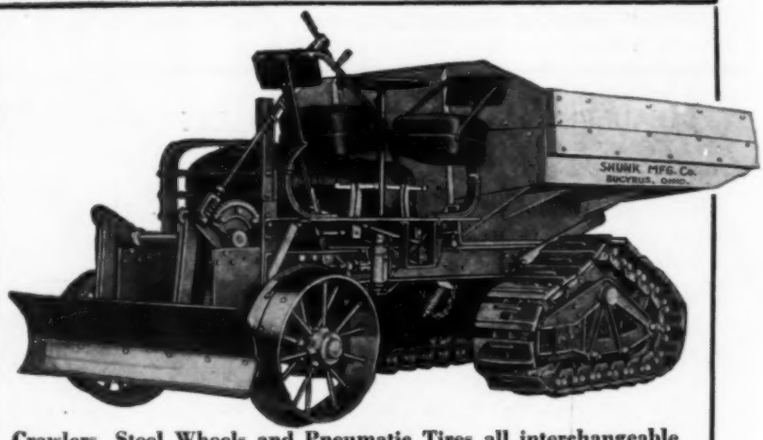

Crawlers, Steel Wheels and Pneumatic Tires all interchangeable on the same axle.

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SPEEDS UP PRODUCTION - CUTS COSTS

- ENGINEERS LIKE IT - CONTRACTORS NEED IT -
USED IN MORE THAN TWENTY STATES

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EFFINGHAM, ILLINOIS

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can invariably be filled by a friend.

The Searchlight Section

of this issue covers the current business wants of the industries in which this paper is read.

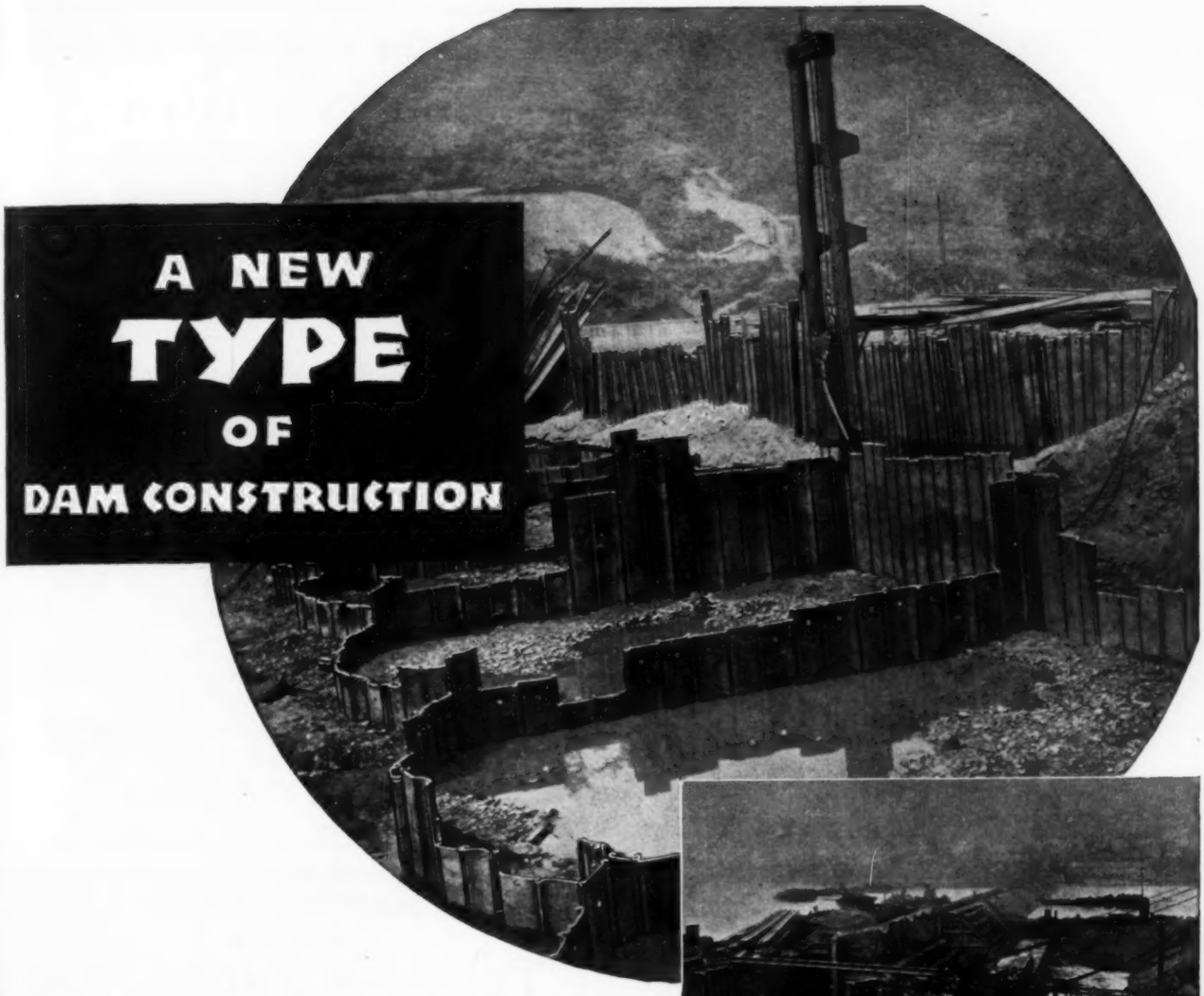
For Every Business Want
"Think SEARCHLIGHT *First"*

A Business Want—

must be satisfied by someone in your industry.

0134

A NEW TYPE OF DAM CONSTRUCTION



A UNIQUE METHOD, radical in its departure from previous practice, was employed by the U. S. Engineer Department of the Pittsburgh District in the construction of Lock and Dam No. 7 on the Allegheny River at Kittanning, Pa. The river bed was not excavated. Instead Carnegie Steel Sheet Piling, section M-113, was driven from river bed to rock - an average depth of 40′ - in the form of connecting cells, the line of which stretched across the river. The dam was then built on top of these cells, the river bed - confined by the interlocking steel sheet piling - serving as a foundation. At the same time, the piling formed a cut-off wall to prevent passage of water under the dam. Depth of water at dam is 15 feet. This method eliminates the necessity for costly excavation and materially reduces the amount of concrete work. It also demonstrates the confidence of U. S. engineers in the strength of interlock, ability to drive under difficult conditions, and the permanence of Carnegie Steel Sheet Piling. The Universal Contracting Company of Portsmouth, Ohio, General Contractor, was also impressed by the splendid performance of the piling.

You can insure satisfaction on your next job by using Carnegie Piling. It is rolled in an efficient range of weights and sizes, including both straight and arch web sections, to cover every possible condition requiring the use of piling. The services of trained engineers are at your command.

CARNEGIE STEEL COMPANY - PITTSBURGH

Subsidiary of United States Steel Corporation

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CARNEGIE STEEL SHEET PILING

98%

of your problems are answered in these two books

By G. UNDERWOOD
Construction Engineer
Author of Standard Construction Methods

Estimating Construction Costs

THIS book provides a simple chart system that gives construction costs at a glance and takes long and tedious headwork out of estimating. Over 400 of the charts are given in ready form for handy use, and cover the estimating of transportation, labor and material costs for all kinds of construction work. The book also presents a complete model estimate for a typical small building, together with a step-by-step description of the methods followed in making it.

CONTENTS: 1. Transportation of Materials. 2. Handling Materials. 3. Excavation. 4. Piling. 5. Concrete. 6. Wood Construction. 7. Brick, Tile and Stone. 8. Structural Steel. 9. Lathing and Plastering. 10. Roofing, Flashing and Waterproofing. 11. Pipework and Heating. 12. Plumbing. 13. Electrical 14. Painting and Glazing. 15. Machinery and Machinery Erection. 16. Overhead. 17. Estimating. 18. Prices of Material.

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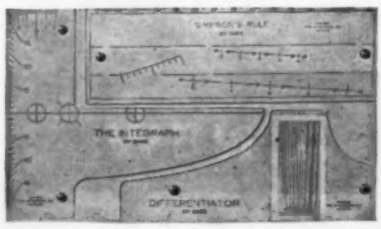

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Read the load

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Weighs 43 lb.
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Contractors who know their costs ... organizations which grasp every opportunity to assure a profit on each job...are using Worthington-Gilman Pavement Breakers in increasing numbers.

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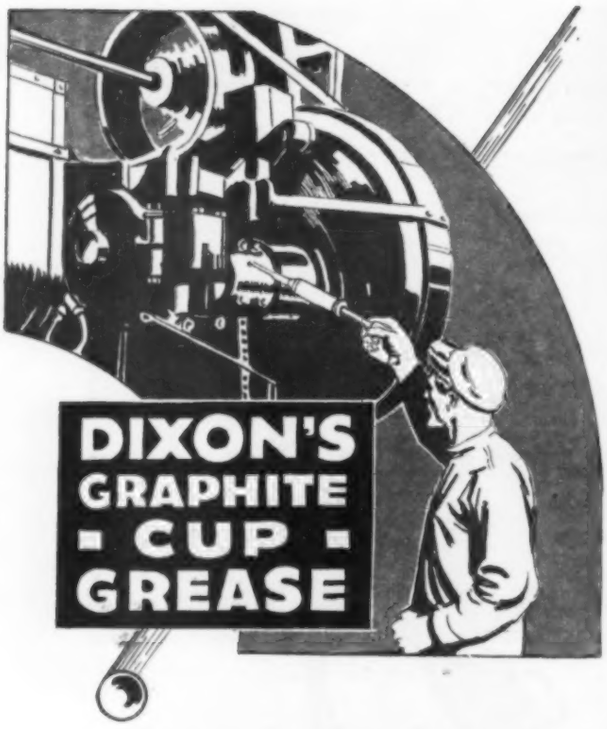

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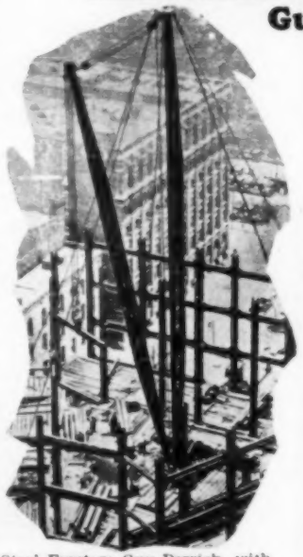

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Carried in Stock at Niagara Falls and New York City

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APPROVED — HIGHWAY RESEARCH BOARD — U.S. BUREAU OF PUBLIC ROADS

the Accepted Method

After inspecting over three thousand miles of Calcium Chloride cured roads in many states; after subjecting these pavements to every practical test for strength and hardness... a special committee of the Highway Research Board reported that Calcium Chloride does not cause cracking or scaling and that concrete so cured attains strengths equivalent to wetted earth.

Some recent tests show that Calcium Chloride cured concrete is even more resistant to wear than water cured concrete. Send the handy coupon for complete data on this improved, modern method of curing.

Calcium Chloride Publicity Committee

Send this coupon to any one of these companies

The Columbia Products Company, Barberton, Ohio
Solvay Sales Corporation, 61 Broadway, N. Y. City
The Dow Chemical Company, Midland, Michigan

Please send complete data on Calcium Chloride concrete curing practice.

Name _____

Position _____

Address _____

CM 4-31

THE FUNDOM

WORKS AT A PROFIT

THE Fundom always works at a profit. It's designed and built to save money on average sized and small jobs.

With ⅓ yard dipper capacity, ¾ full swing, radius of 16½ feet, unusual speed, sturdy construction, the Fundom makes money on every job.

With Boom Extension for clamshell, dragline or crane work, and Trench Hoe Attachment for ditching the versatility of the Fundom is apparent.

You owe it to yourself to investigate the profit-making possibilities of the Fundom. Get the details and name of nearest dealer. Address—

THE FUNDOM HOIST & SHOVEL CO.
314 Central Building, Lima, Ohio

BULL FROG WHEELBARROWS

Seamless, smooth, pressed steel trays

High tray-front and risers give increased capacity and put load *over the wheel*

Heavy angle-iron legs, extended to reinforce handles; double-bolted for rigidity

Heavy angle-iron wheel guard strengthens frame at front

Renewable malleable iron leg-wear shoes

"Never Break" wheel with rivetless malleable iron hub

Grease pocket in hub for efficient lubrication

Malleable iron axle boxes

These advantages tell why Bull Frog barrows last longer and carry more per day per man. They are worth money to any contractor.

Catalog of complete line of barrows, carts and scrapers upon request

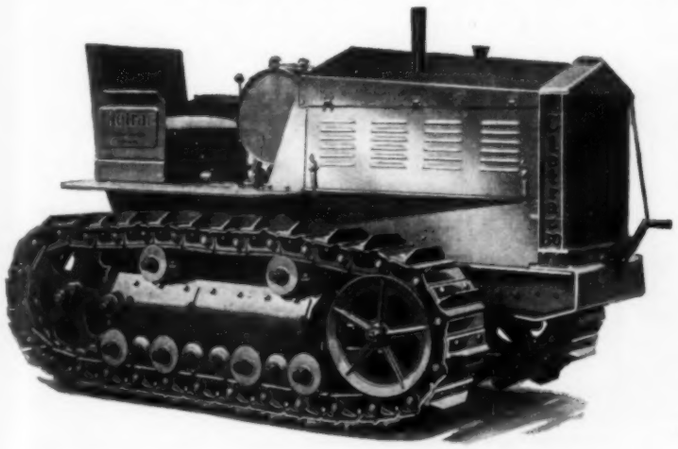
THE TOLEDO WHEELBARROW COMPANY
TOLEDO, OHIO
Branch Office and Warehouse: CHICAGO—520 W. Erie St.

FAST, SURE-FOOTED POWER
That Means SURE SAVINGS!

IT'S that *extra* performance which Cletrac Crawlers are able to put into a job that makes them outstanding favorites with tractor users the world over. Extra power — extra speed — extra ease of operation — these are a few of their features that never fail to make extra savings and earnings.

Cletrac Crawlers turn a bigger proportion of their power into draw-bar action. They travel faster on the straightaways and keep full power on the turns. * They are nimble and flexible and do away with many of the hidden time losses occasioned by slower, less responsive tractors.

But it's not only their ability to crowd more work into a day that makes Cletrac Crawlers so widely preferred. They cut costs, too — with their extraordinary economy of oil and gas and their elimination of "time-out" for daily hand oiling. All Cletrac Crawlers have automatic lubrication to track wheels and other bearings outside the motor.

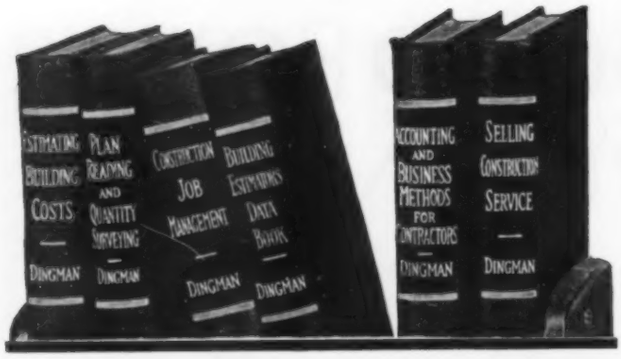


Why not get the complete story of these fast, sure-footed capable crawlers and find out just what they offer in low cost power service? They are built in a complete line of five sizes — up to a maximum of 80 H. P. delivery. See the local distributor, or write for information.

*An exclusive, patented method of planetary gear steering keeps power on *both* tracks when turning.

THE CLEVELAND TRACTOR COMPANY
19323 Euclid Avenue Cleveland, Ohio

Cletrac
Crawler Tractors



Practical facts on every phase of building construction!

HERE is a set of books that is packed to the covers with plans and methods for speeding up production, saving materials and labor, and cutting costs. The six books cover every phase of practical construction work from estimating building costs to the selling of construction service—from plan reading and quantity surveying to practical job management. With these books, the contractor and construction superintendent can make costs come down and profits go up!

The Dingman Building Contractors' Library

The Dingman books have won a wide reputation among builders and building contractors for their sound, practical and easy-to-understand discussion of building construction work. All of the material has been drawn from actual practice.

This library is intended for—

[1] The building contractor who wants a handy reference set that will give him almost instantly a ready answer to most of the problems that come up in the course of the day's work.

[2] The young men in the building industry who intend to make the business of construction their life work, and who want the kind of guidance that will aid them to climb to the top.

Six Volumes, 1149 Pages, Pocket Size, Fully Illustrated

Each one of the volumes in this set is a complete handbook on some important subject. Sturdily bound and pocket size, it will go right "on the job" with you for immediate consultation.

Practical data is given on analyzing a construction job into its component parts—estimating the costs of labor, haulage, equipment, materials, etc.—plan reading and determining quantities from specifications—personnel management—successful supervision of every building operation—efficient and economical business methods—office procedure such as accounting, banking, purchasing, etc.—advertising and selling methods for contracting service—and a complete data book of tables, forms and calculations most frequently used by the builder.

Free Examination—Small monthly payments

Without a cent of expense—without any obligation on your part—you may examine the Dingman Building Contractors' Library for 10 days and determine its value for yourself. Try the books out on your everyday problems—make them prove their worth to you. Unless they meet every test send them back at our expense. If the books prove satisfactory and you decide to keep them, pay only $1.50 in ten days and then $2.00 a month for five months.

Every contractor and builder, every architect and engineer, every student and executive, who is seeking practical help on the everyday problems connected with building construction work should have this valuable reference library.

McGRAW-HILL
FREE EXAMINATION COUPON

McGraw-Hill Book Co., Inc., 370 Seventh Avenue, New York, N. Y.

You may send me for 10 days' free examination, the new six-volume Dingman BUILDING CONTRACTORS' LIBRARY. I agree either to return the books at the end of 10 days or send a first payment of $1.50 then and $2.00 a month for five months.

Signed .....

Address .....

City and State .....

Official Position .....

Name of Company .....

(To insure prompt shipment, write plainly and fill in all lines.)

C.M.-4-31

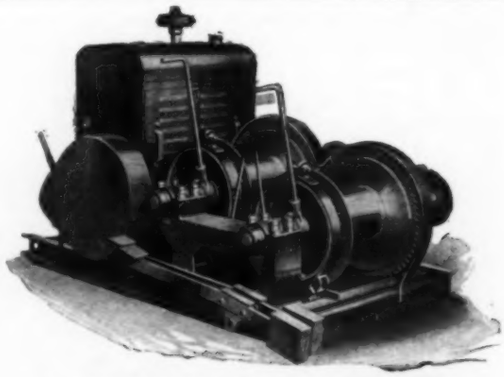
Between the Forms

The WARCO Model "E"

One-man Center Control Power Grader is mighty hard to beat. The operator is above his blade where he has a clear view of his work.

Bulletin 3101 describes the Model "E" and is yours for the asking.

W. A. Riddell Company
Bucyrus, Ohio
Power Graders—Wheeled Scoops—Rear-Type Crawlers for Tractors



SERVICE FIRST

In buying a hoist, if your selection is based on service value—on what the hoist will do for you, or what you can get out of it in real service—you will pick the

DAKE "LG" Type Builder's Hoist

Convenience for ease of operation, dependable power, smooth running qualities and safety are characteristic features. Arc-welded, structural steel construction, many times stronger than cast metal, makes them practically unbreakable and gives you years of added service.

Write for Catalog No. 32 and get full data.

DAKE ENGINE COMPANY
Grand Haven, Michigan

Facts on One Novo Road Pump Supplying Two 27-E's—and

FACT 1

Two Pavers

This particular Road Pump supplied through a 2½" pipe line ample water for two 27-E pavers.

FACT 2

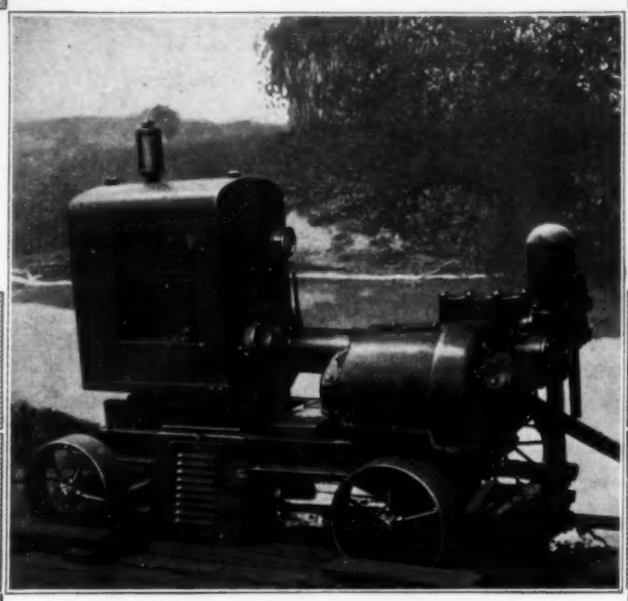
Six Sprinklers

In addition to the 27-E's, six sprinkling hoses were cut into the line. These were operated every night.

FACT 3

Day and Night

The Novo Pump was operating steadily day and night—paving and sprinkling during the day—sprinkling at night.



YOU may never want to push a Road Pump as this Novo was on U. S. Route 40 in Ohio—but this ability to stand the gaff is your biggest safeguard against failure when you and your paving crew need concrete most.

Before you buy any Road Pump check it against the Novo. See if it can give you anything like the Patented Water Governor which saves pump and pipe line—the 200 r. p. m. speed and short, steady flow impulses which end water hammer—and the many other things that make Novos what they are.

NOVO ENGINE COMPANY
CLARENCE E. BEMENT, Vice-President and Gen. Mgr.
214 Porter Street Lansing, Michigan

NOVO
PUMPS · ENGINES · HOISTS

FACT 4

Sundays

On Sundays the Novo was put to work pumping water to settle fills—an all-day job.

FACT 5

At Full Load

Practically all of this time the Novo was running, pumping beyond rated capacity, indicating the large Novo reserve.

FACT 6

Coupon is Important

Novo Engine Company,
214 Porter St., Lansing, Mich.
It brings you complete information on the Novo Road Pump. Send it today.

Your Name.....

Address.....

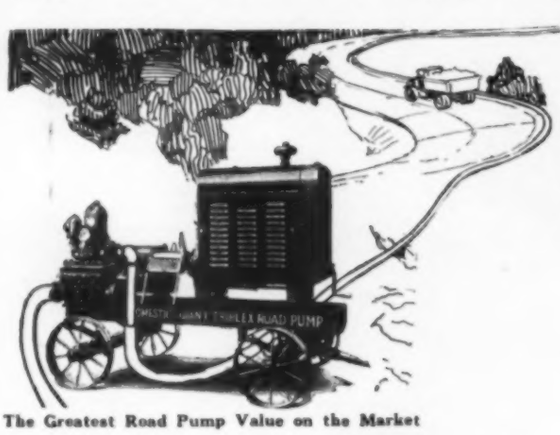
City.....State....

Water—Water—Water

to the Paver far away

Up steep hills, over winding grades, through long pipe lines—that's the requirements of present day road paving and the pump must deliver "all the time," without let-up, full capacity to keep the gang moving and get maximum paving yardage.

The Domestic Triplex Road Pump



The Greatest Road Pump Value on the Market

is the Contractor's Friend

And will stand up to this severe duty day after day and week after week. This "Domestic" Triplex Pump has among its many superior features:

Abrasive-Resisting, Removable Cylinder Linings.
Hydraulic, pressure expanding Plunger Packing.
Herringbone cut steel, self-centering Gears.
Ball Bearings. Automatic Lubrication.
80 to 100 gallons per minute capacity.
500 lbs. pressure. 40 hp., 4-cylinder Engine.

Write us today for Bulletin F

DOMESTIC ENGINE & PUMP CO. (Manufacturers) Shippensburg, Pa.

Distributors in all principal cities throughout the United States

9 OUT OF 10 are ROGERS TRAILERS

SIGNIFICANT of outstanding leadership is the fact that nine out of ten of all low deck or "carry all" Trailers in use are Rogers Trailers.

Equally magnificant is the fact that a majority of the exceptional moving jobs, one of which is here illustrated, are handled with Rogers Trailers.

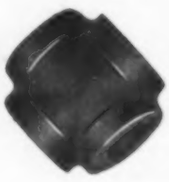
There is a standard unit for your job unless it is very unusual in which case we'll build one to suit.

THE ROGERS BROTHERS CORPORATION
106 Orchard St., Albion, Penna.

Write for Catalog NO. 28

WATSON-STILLMAN
HYDRAULIC FITTINGS

Made From Solid Forged Steel For High Pressures



Too much care cannot be taken in the selection of hydraulic fittings. You do not want to take down a line of piping to replace defective fittings when this necessitates a full or partial shutdown of your plant. Watson-Stillman fittings are tested far beyond their rated strength and insure you against this loss and annoyance. We build everything necessary to the installation of hydraulic systems from pipe to press. Our experience of nearly 70 years is at your disposal.

Write for catalog

THE WATSON-STILLMAN CO.
114 Aldene Road, ROSELLE, N. J.

delivered promptly

A mile and a half of massive concrete to control the Mississippi and safeguard New Orleans — that is the Bonnet Carre Spillway, in which some 60,000 feet of Carey Elastite Expansion Joint is installed.

Carey Elastite Expansion Joint has been protecting roads and other concrete structures against stresses for almost 20 years. Stocks are carried in all principal centers and a corps of experienced engineers can supply any data required for special installations. 1931 Price List and trade discounts will be mailed on request.

STEVENS BROTHERS AND THE MILLER-HUTCHINSON COMPANY
CONTRACTORS — BONNET CARRE SPILLWAY
NEW ORLEANS, LOUISIANA

BELLERS, LA.,

November 19th, 1930

Mr. J. C. Rector, District Manager,
The Philip Carey Company,
Audubon Building,
New Orleans, La.

Dear Sir:-

During the course of the construction of the Bonnet Carre Spillway, we have found it necessary on a number of occasions to call upon you for shipment of fairly large quantities from your local warehouse stock at New Orleans.

We are glad to be able to say that such orders have been filled without delay and without the inconvenience and loss of time that would have resulted had it been necessary to depend on shipments from your plant or from other points of distribution.

Such prompt service has, to that extent, expedited the work on the Bonnet Carre Spillway project.

Very truly yours

STEVENS BROS. & THE MILLER-HUTCHINSON CO.

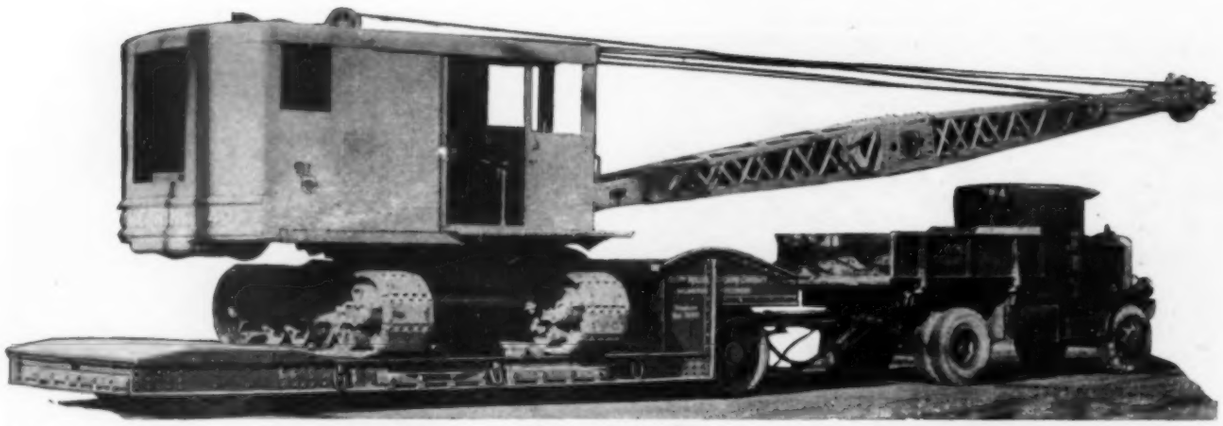
By R. S. Hutchinson

THE PHILIP CAREY COMPANY x Lockland, Cincinnati, Ohio
Branches in Principal Cities

BUILT-UP ROOFS
ASPHALT PRODUCTS
ELASTITE EXPANSION JOINT
WATERPROOFINGS
ROOF PAINTS

Carey PRODUCTS

HEAT INSULATIONS
ASBESTOS MATERIALS
CAREYSTONE CORRUGATED SIDING
ASFALTSLATE SHINGLES
BUILDING PAPERS



Haul Bigger Pay-Loads

with the original minimum-weight heavy duty trailer

IT will pay you to get this trailer. It gives you bigger capacity because of the

Exclusive WILLIAMS features—

Improved rear-end construction; wheels in free-swiveling frames stronger front end; larger bearings— Greater strength without increased weight.

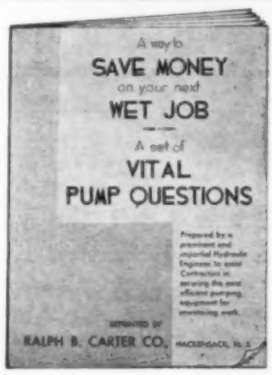
Everywhere, heavier loads are being hauled with the WILLIAMS "Arch-Girder" Trailer— at a new low cost. Write us for bulletin.

G. H. WILLIAMS COMPANY
607 Haybarger Lane, Erie, Pa.
Branch Offices: New York, Pittsburgh, Cleveland, Chicago

WILLIAMS
TRAILER--BUCKETS

292

A HUMDINGER Answer to every Pump Problem



Whether it is open excavation, well-point, sewage, pier hole or trench, this little booklet will save you many pump dollars on your next contract.

SEND FOR IT TO-DAY

Use this coupon

RALPH B. CARTER CO.
192 Atlantic St., Hackensack, N. J.

Please send me booklet **"A Way to Save Money on Your Next Wet Job."**

Name .....

Address .....

City ..... State .....

The Toledo Torch

From Maine to California, Toledo Torches are used by the man who really knows what safety lights are for.

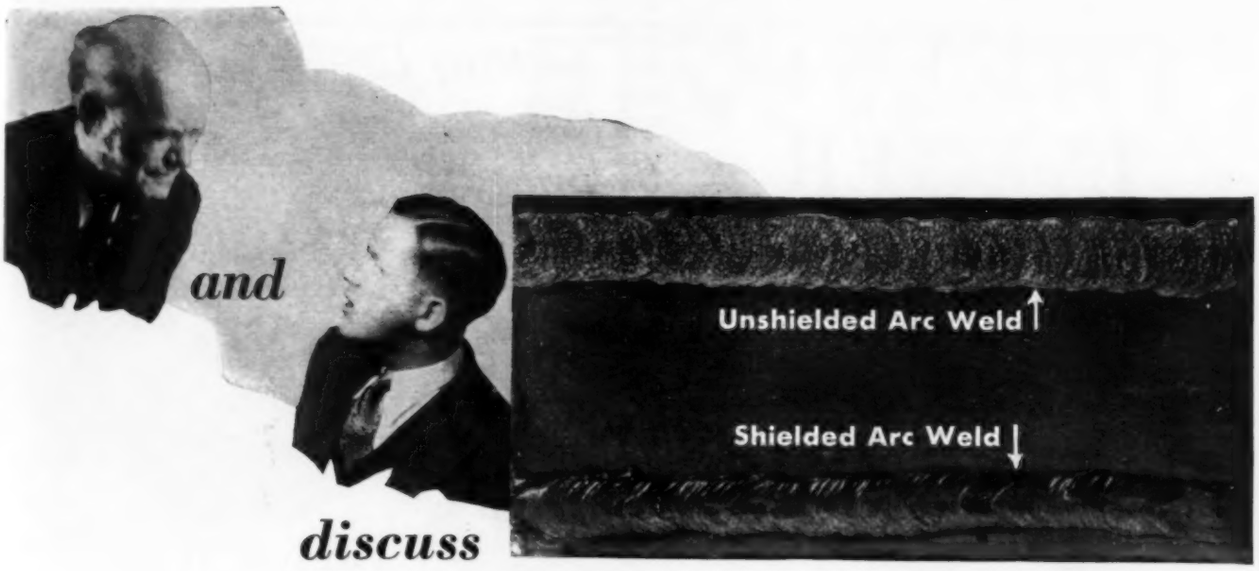
the safety light most widely used because it is the greatest value

USE THE TOLEDO TORCH AS STOCK SIGNAL DURING SAFETY

The Toledo Pressed Steel Co.
TOLEDO OHIO

Save with Steel

Manufacturers of The Toledo Horse—the ideal highway barricade



NON-CORROSIVE WELDS

"But, lad, how can one weld be attacked more by corrosion than any other weld? Is it a difference in the make-up of the metal deposited?"

"That's very nearly it, as the photograph of two welds shows. The chemical content of the metal in the rod that made the upper weld is the same as the metal in the rod that made the lower weld. A 72-hour immersion in a 50% hydrochloric acid solution of a test sample containing welds made by a 'Shielded Arc' and an ordinary arc shows a difference in the metal of the welds."

"How come that a change can be made so quickly, while the metal is on its way from the rod to the weld?"

"The metal on the way from the rod to the weld is in a molten state and absorbs oxygen and nitrogen from the surrounding atmosphere. Oxygen and nitrogen are necessary for human life but are not good for welds. The lower weld was shielded from the oxygen and nitrogen of the air by a Lincoln 'Shielded Arc' process."

"Then you feel that resistance of welds to corrosion is something that all users of arc welding should INVEST in?"

"Yes . . . for the LONG PULL, because a Lincoln 'Shielded-Arc' weld will stretch at least 18% in 2 inches and will not break until pulled to a tension of 60,000 to 75,000 lbs. per sq. in. Another reason for linking with

LINCOLN

W-171

A product of the largest manufacturers of Arc Welding Equipment in the World

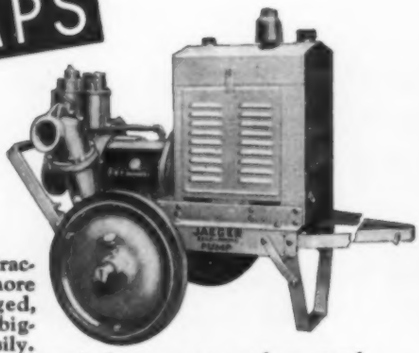
THE LINCOLN ELECTRIC COMPANY, CLEVELAND, OHIO

Put It Up to JAEGER Equipment in 1931

MIXERS

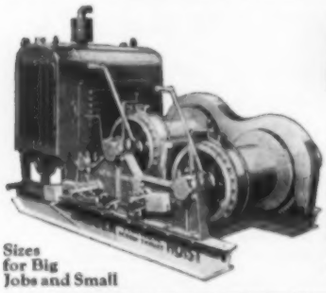
From 3½S trailer to 84S central mix unit, ready to set the pace for low cost construction, a bigger day's work and a profit in close-figured jobs. Improved "Dual-Mix" Tilters double mixing efficiency. Heavy duty Non-Tilt types fit every condition, any job.

PUMPS



1931 Jaeger Contractors' Pumps are more powerful, rugged, efficient, handle bigger volumes easily. Simpler construction and fewer parts reduce total weight. Prices on all types, all sizes, are real 1931 news.

HOISTS



Sizes for Big Jobs and Small

Timken Screw Thrust type, with more speed, more power, more improved features than you've ever been able to buy in any hoist—*at lower prices!* Single and double drum; gas, electric.

WRITE FOR 1931 CATALOG, PRICES!

THE JAEGER MACHINE CO., 800 Dublin Ave., Columbus, Ohio

Send latest catalog and 1931 prices on [ ] Tilting Mixers [ ] Non-Tilt Mixers [ ] Pumps [ ] Timken Thrust Hoists.

Name_____

Address _____

_____

Cutting 12" Oak Piling 8" Below the surface with

Air Driven

The **Timber Wolf**

Portable Sawing Machine

The Greiling Engineering Co., at Frankfort, Michigan, used the Timber Wolf in cutting piling 8 in. and 20 ft. below the surface. Here operators are supported on timber framed either side of piles. The compressed air drive is supplied for cutting timber under water, to any depth in which divers can operate steadily and with great savings in labor. A.C. and D.C. electric or air driven. Write for details.

REED-PRENTICE CORP.

Worcester, Mass. *Agents in Principal Cities*

Fultex WATERPROOFED

TARPAULINS & TENTS

"FULTON QUALITY" Tarpaulins and Tents can be depended upon in all kinds of weather to give complete protection to your supplies, equipment and workmen. Write our nearest plant today for samples and prices on "SHUREDRY" Tarpaulins, Windbreaks; "FULTEX" Tarpaulins, Tents; "USAMP" and "DFMP" Commercially Mildewproof Tents; Roll Duck, Burlap Covers and Burlap in Bales.

Fulton Bag & Cotton Mills

Manufacturers Since 1870

Atlanta St. Louis Dallas

Minneapolis Brooklyn New Orleans Kansas City, Kan.

REVERSIBLE MECHANICAL POWER HOIST

FOR ALL SHORT WHEEL BASE TRUCKS

$190.00

COMPLETE WITH BODY ILLUSTRATED AND HOIST WITH REVERSIBLE POWER TAKE OFF

F.O.B. GALION, O.

Gives Full Power Control in Either Raising or Lowering Positions

The Perfection power mechanism does not rely on gravity for any operation.

The point of lift arms and the gears lock the body automatically in riding position.

Driving to drop part of load cannot effect or lower the position of the body.

Send now for literature showing mechanical details and the complete line of steel bodies furnished with this unit.

THE PERFECTION STEEL BODY CO.
GALION, OHIO

THE **PERFECTION** MECHANICAL POWER **DUMPING UNIT**

POSITIVE CONTROL IN ANY POSITION.

PERFORMS EVERY REQUIRED OPERATION—AND HAS THE ADVANTAGE OF DIRECT GEAR POWER APPLICATION.

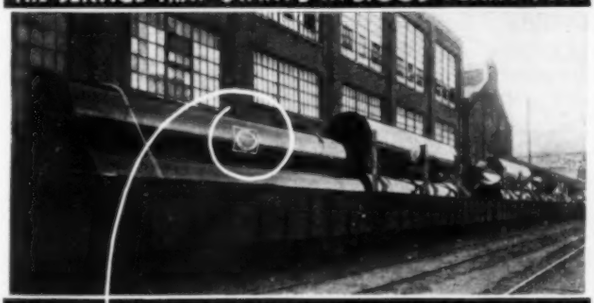
ALL OPERATIONS CONTROLLED FROM THE DRIVERS SEAT.

AUTOMATIC SAFETY POWER CUT-OFF

PERFECTION BODIES AND HOISTS

WE SOLVE YOUR SPECIAL PURPOSE BODY PROBLEMS

THE SERVICE THAT STARTS IN BIGGS' PLANT . . . .



SHOWS ITSELF MOST CLEARLY IN YOUR DITCH

Above is a typical day's production of Biggs electrically welded steel pipe in connection with three major water works projects involving 50,000 feet of 30 in., 48 in., and 72 in. welded pipe.

BIGGS Electrically Welded Steel Pipe comes to your exactly as you want it. Actual acquaintance with field conditions you will encounter enables Biggs service to save time and money in your construction costs. Joints come at convenient points. Specials are on hand when needed. The pipe fits accurately. Testing goes off without a hitch. Consult with Biggs on the next pipe line in your territory.

BIGGS WELD — DUCTILE — UNIFORM — STRONGER THAN THE PLATE ITSELF

The Biggs Boiler Works Co., Akron Ohio.

Don't Overlook Opportunities

Men who regularly keep in touch with the market through other channels often overlook the many opportunities that are to be found in the

SEARCHLIGHT SECTION

For Every Business Want

"Think* SEARCHLIGHT *First"

SEARCHLIGHT SECTION

EMPLOYMENT : BUSINESS : OPPORTUNITIES : EQUIPMENT—USED or SPECIAL

UNDISPLAYED—RATE PER WORD:
Positions Wanted, 5 cents a word, minimum $1.00 an insertion, payable in advance.

Positions Vacant and all other classifications, 10 cents a word, minimum charge $2.00.

Proposals, 50 cents a line an insertion.

INFORMATION:
count 10 words additional in undisplayed *Box Numbers* in care of any of our offices ads.

Discount of 10% if one payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

DISPLAYED—RATE PER INCH:
1 inch $7.50
2 to 3 inches..... 7.25 an inch
4 to 7 inches..... 7.00 an inch
Other spaces and contract rates on request.
An advertising inch is measured vertically on one column, 3 columns—30 inches—to a page.

COPY FOR NEW ADVERTISEMENTS RECEIVED UNTIL 3 P. M. ON THE 2ND FOR THE ISSUE OUT THE 9TH OF THE MONTH. C.M.

POSITIONS VACANT

WANTED: If you are in need of Construction Engineers, experienced in superintending, estimating, drafting and purchasing, you should place your need before the live wire readers of Construction Methods. Send your ad today to Searchlight Dept. Construction Methods, Tenth Ave. at 36th St., New York.

CONSTRUCTION superintendents, experienced in concrete arch bridges, difficult foundations, river work, heavy shoring, cofferdams, pile driving, sewage treatment, water purification plants, etc., can readily be obtained through an advertisement in the Searchlight Section of Construction Methods. Send your ad today to Searchlight Dept., Construction Methods, Tenth Ave. at 36th St., New York.

FREE BULLETINS

Donald B. MacNeal, 121st & Loomis, Chicago, Ill. 4 page illustrated Buyers and Renters List containing cranes, draglines, shovels, cars, track locomotives, contractors equipment, etc.

S. W. Lindheimer, Inc., 38 So. Dearborn St., Chicago, Ill. New pamphlet 7" x 9", illustrating various sections of Steel Sheet Piling and containing specification data re width, strength, weight, etc.

Rennolds Equipment Co., 6 No. Michigan Ave., Chicago, Ill. Stock List No. 116, 4" x 8½", containing items of rebuilt construction equipment including air compressors, cranes, shovels, draglines, piling, hammers, etc.

Don't forget the **Box Number**

WHEN answering the classified advertisements in this magazine, don't forget to put the box number on your envelope. It's our only means of identifying the advertisement you are answering.

STEEL PILING

MOST ECONOMICAL SECTIONS ROLLED

1 RENTAL—On this basis, Foster furnishes piling for temporary use for any period of time. Agreement accommodates lessor's requirements and encourages this economical method of securing piling. No deposit required. Rental figures are surprisingly low.

2 SALE WITH RE-PURCHASE AGREEMENT—This agreement offers you the privilege of purchasing piling with an option to dispose of it at an agreed figure when the purpose for which you bought piling is fulfilled. Foster simply agrees, at the time you buy piling from him, to re-purchase that piling from you at a future date, if you wish to sell it.

3 OUTRIGHT SALE—Foster offers new piling for immediate shipment on outright sale, when desired. Where used piling may be employed to advantage on permanent work, Foster is able to supply requirements at prices that stimulate buyers' preference. The purchase of Foster's guaranteed used piling, therefore, makes it possible for many to effect tremendous savings in piling work.

GUARANTEE—Every length of piling leased, bought on sale with re-purchase agreement, or bought outright from Foster is subject to your approval at destination; should your inspection disclose a single unsatisfactory length, replacement will be made at our expense.

Any Quantity Suitable Lengths
Prompt Shipment from Convenient Points

All piling sections furnished by Foster have the universal interlock of these line contact shows.

Interlocks afford water-tightness, and strength, and ample clearance for free driving and pulling.

Phone, Write, or Wire for Foster Quotations

L. B. FOSTER COMPANY
NEW YORK PITTSBURGH CHICAGO
Warehouses: Jersey City, N. J. Carnegie, Pa.
Baltimore, Md. Chicago, Ill.

SUPT'S ... FOREMEN ... YOUNG MEN

A Business Opportunity

$5,000 to $10,000 a year—and upwards to $20,000 or more, can be made of a business opportunity that exists in your territory—a place where some far-sighted, peppy, energetic young man is going to step in—and build a small capital into a very profitable business—and where he can capitalize on his present knowledge of the Construction Industry, without competing with it. If you think you are the man in your territory to make this money—write for details, today.

• BOX 112 •
LORAIN, OHIO

Agents
Salesmen
Representatives
Selling Opportunities

You can find them all through an ad in the

SEARCHLIGHT SECTION

Your ad here will have the attention of the whole industry and the cost is small.

For Every Business Want
"Think SEARCHLIGHT *First"*

How
WEMLINGER SERVICE
HELPS THE CONTRACTOR
Example No. 1.

A NATION WIDE SERVICE
WEMLINGER
STEEL SHEET-PILING

SURVEY on a pipe line job showed a 25 ft. sheet piling needed, which we furnished. But rock at surface made piling 4 or 5 ft. too long, obstructing a cableway. **Wemlinger** took back the long lengths and gave short ones. The contractor simply paid for the trucking. **Wemlinger Service** is founded on 24 years' experience and is equal to any problem in the steel sheet piling field.

STEEL SHEET PILING, NEW, USED
—RENTED, LEASED, BOUGHT, SOLD

Main Office
NEW YORK, N. Y.
140 Broadway

CHICAGO, ILL.
228 N. La Salle St.

BOSTON, MASS.
31 State St.

RICHMOND, VA.
1708-1722 Lewis St.

ST. LOUIS, MO.
Paul Brown Bldg.

TAMPA, FLA.
315 Tampa St.

LOS ANGELES, CALIF.
2044 Santa Fe Ave.

NEW **STEEL SHEET PILING** USED

SOLD RENTED BOUGHT

SAVE MONEY TIME TROUBLE

FOR FOUNDATION, COFFERDAM AND SEWER WORK
Prompt shipment from warehouse stocks at various locations.

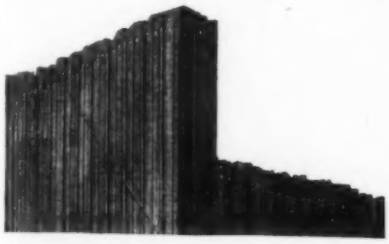
LINDHEIMER SERVICE

S·W·LINDHEIMER INC.

38 South Dearborn Street CHICAGO, ILLINOIS Phone State 8561

Chicago Phone
RANdolph 8787

STEEL SHEET PILING
NEW AND USED



SOLD BOUGHT — Stocks at principal points throughout the country for prompt shipment — RENTED REPURCHASED

HYMAN-MICHAELS COMPANY

ST. LOUIS **CHICAGO** SAN FRANCISCO
20 N. Wacker Drive
HOUSTON LOS ANGELES NEW YORK SEATTLE

Where Have My Profits Gone?

The answer to this question is frequently found in a list of the idle equipment you have on hand—equipment you will never use again. Turn this into CASH before the junk pile claims it.

Contractors and others may now be looking for just what you have. Let the field know what you have to SELL.

You can reach thousands of prospective buyers of good used construction equipment through a "Searchlight" advertisement.

Act Immediately and Turn This Idle Equipment into Cash

For advertising rates and information address
SEARCHLIGHT DEPARTMENT, Tenth Ave. at 36th St., New York

$9850 Freight Prepaid

FACTORY REBUILT

LORAIN-75 Shovel. 21-ft. boom, new 16-ft. or 18-ft. steel dipper stick, 1¼ cu.yd. manganese dipper, Waukesha WS gasoline engine, center drive crawler, steel cab. Prepaid Freight within 500 miles of Lorain, Ohio. Factory Warranty—Price $9,850—Liberal Terms. Shipment from stock—subject prior sale.

BARGAIN OF THE MONTH

A complete line of rebuilt and reconditioned shovel and crane equipment—½ to 1¼ yd. capacity. Write or phone collect for data—Lorain 8265 or 6955.

OVERLOOK MACHINERY SALES
2502 E. Erie Ave., Lorain, Ohio

It will interest you to know—

An advertiser writes: "It will interest you to know that we received our first order from the ad. . . . the day after the paper came out.

Other inquiries have of course followed but we are surprised and pleased at the immediate response to our advertisement."

You, too, can use "Searchlight" advertising in your business, *profitably*. Just write to—

Searchlight Department
Tenth Ave. at 36th St., New York City

ALPHABETICAL INDEX TO ADVERTISERS

This index is published as a convenience to the reader. Every care is taken to make it accurate, but *Construction Methods* assumes no responsibility for errors or omissions.

	Page
Allis-Chalmers Mfg. Co.	29
American Cable Co.	2nd Cover
American Steel & Wire Co.	86
Ames Shovel & Tool Co.	16
Austin Mchry. Corp.	14-15
Austin Western Road Machry. Co.	79
Autocar Company	4
Baker Mfg. Co.	85
Barber-Greene Co.	66-67
Bates Valve Bag Corp.	72
Bay City Shovels, Inc.	12
Biggs Boiler Works Co.	103
Black & Decker Mfg. Co.	83
Blaw-Knox Co.	20-21-22
Buckeye Traction Ditcher Co.	84
Bucyrus-Erie Co.	9
Calcium Chloride Publicity Committee	94
Carey Company, Philip	99
Carnegie Steel Co.	89
Carter Co., Ralph B.	100
Caterpillar Tractor Co.	93
Chain Belt Company	62-63
Cleveland Rock Drill Co.	7
Cleveland Tractor Co.	95
Clyde Iron Works Sales Co.	6
Columbia Products Co.	94
Consolidated Iron & Steel Co.	76
Dake Engine Co.	96
Davey Compressor Co., Inc.	73
Dietz Company, R. E.	77
Dixon Crucible Co., Joseph	92
Dobbie Fdry. & Mach. Co.	92
Dodge Bros. Corp.	68
Domestic Eng. & Pump Co.	98
Dow Chemical Co.	94
DuPont de Nemours & Co., E. I.	74-75
Fairbanks, Morse & Co.	10
Foote Company	25
Fulton Bag & Cotton Mills	102
Fundom Hoist & Shovel Co.	94
Galion Iron Works & Mfg. Co.	65
Hauck Mfg. Company	17
Hazard Wire Rope Co.	64
Headley Emulsified Prod. Co.	87
Heltzel Steel Form & Iron Co.	3
Hercules Powder Co.	92
Hitchcock Co., Inc.	28
Integraph Company	90
Jaeger Machine Co.	102
Lakewood Engrg. Co.	4th Cover
Le Roi Company	23
Leschen & Sons Co., A.	13
Linde Air Products Co. (Unit of Union Carbide & Carbon Co.)	3rd Cover
Lincoln Electric Co.	101
Link Belt Company	27
Lowell Wrench Company	72
McGraw-Hill Book Co.	90-96
Martin Decker Corp.	90
Moritz-Bennett Corp.	88
National Equipment Co.	69-70-71
Northwest Engineering Co.	5
Novo Engine Co.	97
Owen Bucket Co.	11
Perfection Steel Body Co.	103
Porter, Inc., H. K.	77
Ransome Concrete Mchry. Co.	8
Reed-Prentice Corp.	102
Reo Motor Car Co.	80
Riddell Co., W. A.	96
Roebling's Sons Co., John A.	Insert, 81-82
Rogers Brothers Corp.	98
Schramm, Inc.	26
Searchlight Section	104-105
Shunk Mfg. Company	88
Solvay Sales Corp.	94
Sterling Wheelbarrow Co.	76
Sullivan Machinery Co.	24
Thew Shovel Co.	18-19
Toledo Pressed Steel Co.	100
Toledo Wheelbarrow Co.	94
Universal Atlas Cement Co.	30
Universal Crane Co.	61
Vulcan Iron Works	78
Watson-Stillman Co.	98
Williams Co., G. H.	100
Worthington Pump & Mchry. Corp.	91

▼ ▼ ▼

SEARCHLIGHT SECTION
Classified Advertising

Classifications	Page
BUSINESS OPPORTUNITIES	104
EMPLOYMENT	104
USED AND SURPLUS EQUIPMENT	
Foster Co., L. B.	104
Hyman-Michaels Co.	105
Lindheimer, Inc., S. W.	105
Overlook Machinery Sales	105
Wemlinger, Inc.	105

Saving is a good habit, BUT—
Why Save Things You'll Never Use?

Undoubtedly you have some equipment which you will never use again. It is still in good, serviceable condition—it ought to be working for someone, instead of lying idle. Have you ever given thought to the fact that this equipment can be turned into CASH?

If the equipment is in good condition there is a market for it. Tell prospective buyers everywhere what you have to sell. You can reach the largest number at small cost through an advertisement in the Searchlight Section of CONSTRUCTION METHODS.

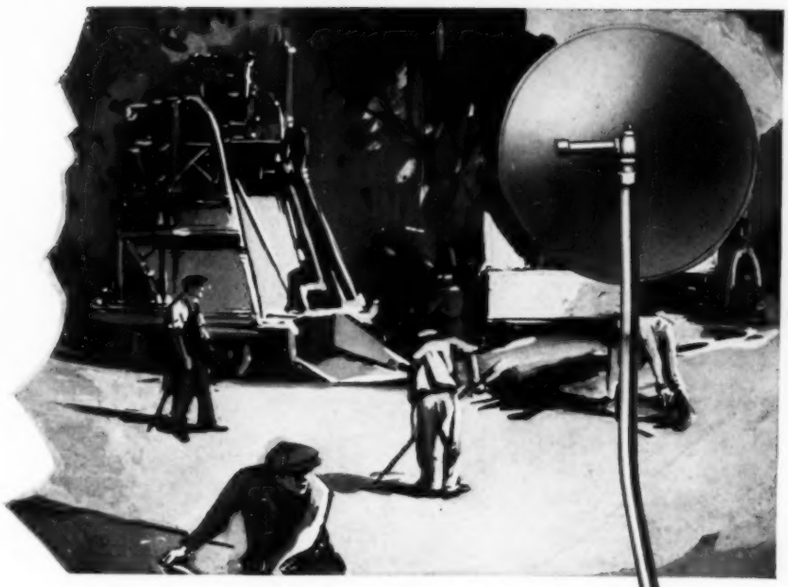
If there is something you want to sell—a crane, a patent, a complete business—just write a letter today to the Searchlight Department.

ADDRESS:

SEARCHLIGHT DEPARTMENT

Tenth Ave. at 36th St., New York, N. Y.

Bridge the Gap
between
PENALTY
and
BONUS *with*



CARBIC LIGHT

Thousands of contractors are prepared with Carbic Flood Lights to work after sundown, whenever and wherever necessary to keep the job on schedule. They have found a way to regain lost time.

Carbic Light affords ideal illumination for any emergency. The powerful rays of clear white light are perfectly diffused so there is no glare and no dark shadows. This enables your men to work rapidly and safely. Carbic Light penetrates fog, smoke or dust to a remarkable degree. Carbic Flood Lights are compact, self-contained, portable, easy to operate and safe. They are moderately priced and inexpensive to operate. They should be a part of every progressive contractor's equipment.

All Carbic Flood Light reflectors are chromium-plated. They are rust-and tarnish-proof.

Sold by leading jobbers everywhere

Let us send you this booklet describing in detail Carbic Flood Lights and their uses. A request on your letterhead will bring it.

CARBIC
PROCESSED CARBIDE FOR CARBIC LIGHTS & GENERATORS

THE LINDE AIR PRODUCTS COMPANY

Unit of Union Carbide and Carbon Corporation

126 Producing Plants UCC 627 Warehouse Stocks

IN CANADA, DOMINION OXYGEN COMPANY, LTD., TORONTO

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Baltimore	El Paso	New York
Birmingham	Houston	Philadelphia
Boston	Kansas City	Pittsburgh
Buffalo	Los Angeles	St. Louis
Chicago	Memphis	Salt Lake City
Cincinnati	Milwaukee	San Francisco
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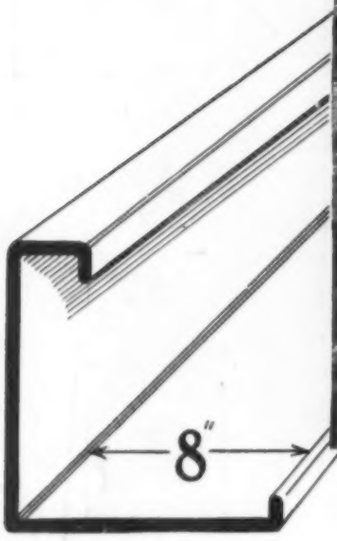
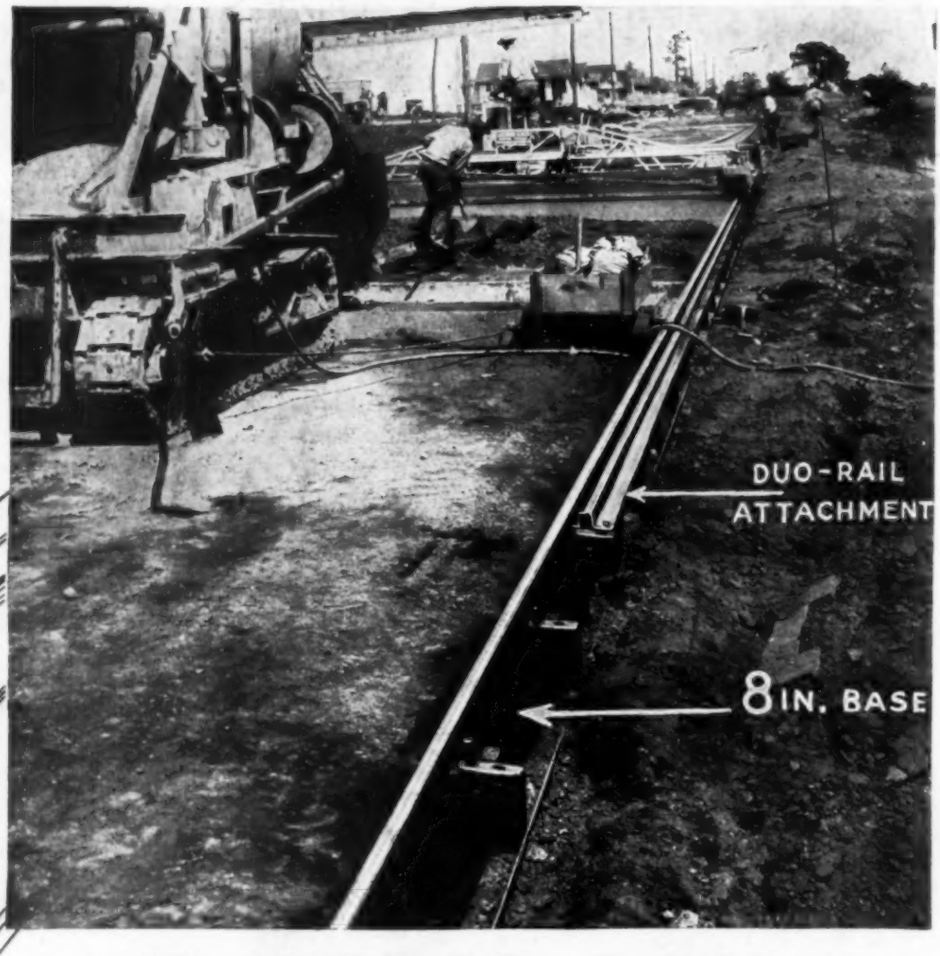
Denver		Tulsa

LINDE OXYGEN · PREST-O-LITE ACETYLENE · OXWELD APPARATUS AND SUPPLIES · UNION CARBIDE

LIBRARY
DETROIT BUREAU GOVT RES INC
51 WARREN AVE W
DETROIT MICH

LAKEWOOD SUBGRADER, for accurate, low cost subgrading. Works only a few hours a day; saves money on the whole job.





LAKEWOOD ROAD FORMS...

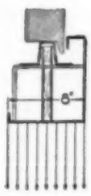
with or without Duo-Rail Attachment

CONTRACTORS who equip for today's requirements and tomorrow's specifications are buying Lakewood Road Forms with 8 inch base. Job after job proves the superior strength and rigidity of the Lakewood construction, with flanged base and improved Slide Joint. And on soft ground, where tipping or settling forms create a problem, the contractor with Lakewood Forms needs only 100 to 125 feet of "Duo-Rail" attachment (an exclusive Lakewood feature) to **center** the load over the base, giving the best form loading condition.

For longer service, reserve stability and the elimination of costly hand work, standardize on Lakewood Forms.

Write or Wire for CATALOG C

LAKEWOOD TYPE "C" FINISHER, meets every requirement for fast, steady production on concrete or bituminous streets and highways.



When needed, "Duo-Rail" attachment centers load, adds stability, eliminates chance of form settlement.

LAKEWOOD ROAD PUMPS
LAKEWOOD ROAD FORMS
LAKEWOOD FINISHING MACHINES
LAKEWOOD FLOAT. BRIDGES
LAKEWOOD BATCH BOXES . . . NARROW GAUGE CARS
LAKEWOOD SUB GRADERS GRADEROOTERS
LAKEWOOD STRAIGHT EDGES

THE LAKEWOOD ENGINEERING CO.

COLUMBUS, OHIO, U.S.A.